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Lachesis Lapponica,

OR A

TOUR IN LAPLAND,

NOW FIRST PUBLISHED

FROM THE

ORIGINAL MANUSCRIPT JOURNAL

OF THE CELEBRATED

LINNÆUS;

84856

BY

JAMES EDWARD SMITH, M. D. F. R. S. ETC.
PRESIDENT OF THE LINNÆAN SOCIETY.

IN TWO VOLUMES.

VOL. I.

X-9 /

"Ulterius nihil est, nisi non habitabile frigus."

OVID.

LONDON:

PRINTED FOR WHITE AND COCHRANE, HORACE'S HEAD,
FLEET-STREET,
BY RICHARD TAYLOR AND CO., SHOE-LANE.

1811.

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Smi/Lac
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TO

THOMAS FURLY FORSTER, Esq.

FELLOW OF THE LINNÆAN SOCIETY.

My dear Sir,

Among the various consultations and communications which have taken place between us in the course of our long and uninterrupted friendship, I recollect that one object of your anxious curiosity has always been the Lachesis Lapponica *of Linnæus, so often alluded to by himself and his pupils, and the original Swedish manuscript of which came into my hands with the rest of his*

collection. Of this I now present you with an English translation; and I offer it to you with the more satisfaction, because you are, amongst all my Linnæan acquaintance, one of the most capable of entering into every feeling of the original writer. His love of truth and of nature were not more ardent than your own, nor was his mental profit more. You, who have so deeply studied the works he prepared for the public, will with no less pleasure listen with me to his familiar conversation. We here behold, not the awful preceptor of the learned

world in his professorial chair, but a youthful inexperienced student, full of ardour and curiosity, such as we ourselves have been, recording his ideas and observations for his own use, not delivering them forth for the instruction of others; and while we admire his perseverance and acuteness, we can sympathize with his embarrassments, and readily pardon his very inconsiderable mistakes. Happy are those who, like you, can equally sympathize in his pious and benevolent affections, his disdain of hypocrisy and oppression, and his never-ceasing de-

sire to turn his scientific acquisitions to practical utility!

Be pleased, my dear Sir, to accept, with your usual favour, this sincere tribute of respect and esteem, from

Your very faithful friend,

J. E. SMITH.

PREFACE

BY THE EDITOR.

THE biographers of Linnæus have often mentioned the Journal of his Lapland Tour, to which he himself has frequently adverted, in various parts of his voluminous works, under the title of *Lachesis Lapponica*. The publication of this Journal has been anxiously desired; and so valuable was the manuscript considered, that on his whole collection and library being sold, after the death of his son, it was remarked that these papers at least ought to have been retained in Sweden, as a national pro-

perty; the journey which they record having been undertaken at the public expense, and the objects illustrated thereby being, necessarily, more important to the author's countrymen than to any other people. This remark, however, was not made till long after the manuscript, with all the treasures which accompanied it, had escaped, by land and by sea, the pursuit instituted by the Swedish monarch to recover them, and had reached England in safety. It became a duty for their fortunate possessor to render them useful. To place the authority of this collection, as far as possible, out of the reach of accident, he has made it his chief object to extend any information to be derived from it, not only to his own countrymen, but to his fellow-labourers in

every quarter of the globe. The Banksian herbarium was, in the course of seven months, compared with that of Linnæus throughout, to their mutual advantage, by a copious interchange, not only of information, but of specimens. Plants or insects were for many years continually sent from France, Switzerland, Italy, Spain, Germany, and even Sweden, as well as from America, for comparison with the authentic originals named by the hand of Linnæus. The time and labour devoted to this task have been richly compensated, by the acquisition of various novelties, and of much instruction, as well as by the pleasure of so extensive an intercourse with persons occupied in the same favourite and delightful pursuit, and by

the acknowledgements with which most of them have overpaid the trouble.

The manuscripts of Linnæus were no less freely consulted; but great was our disappointment to find the *Lachesis Lapponica* written in Swedish. For a long time therefore it remained unexplored. At length Mr. Charles Troilius, a young gentleman in the mercantile line, resident in London, undertook the task of translating it. The manuscript proved to be the identical journal written on the spot during the tour, which certainly rendered it the more interesting; but the difficulty of decyphering it proved from that very circumstance unexpectedly great. The bulk of the composition is Swedish, but so inter-

mixed with Latin, even in half sentences, that the translator, not being much acquainted with this language, found it necessary to leave frequent blanks, giving a literal version only of what he was able to read. The whole abounds also with frequent cyphers and abbreviations, sometimes referring to the publications or opinions of the day, and intended as memorandums for subsequent consideration. It is, in short, such a journal as a man would write for his own use, without the slightest thought of its ever being seen by any other person. The composition is entirely artless and unaffected, giving a most amiable idea of the writer's mind and temper; and it cannot but be considered as highly curious, to contemplate in these pages the development of such a mind as that of

Linnæus. As not a word throughout the whole was written for the use of any person but the author, the reader may perhaps be disappointed at not meeting with any thing like a professed description of Lapland, or even a regular detail of the route of the traveller. What was familiar to Linnæus, either in books or in his own mind, is omitted. By the brilliant sketches he has left us in his *Flora Lapponica*, published a few years after his return, we see what he might have written had he here undertaken to communicate his own knowledge or remarks to others; and the same may be said of such of his dissertations, in the *Amœnitates Academicæ*, as professedly treat of subjects belonging to Lapland. The curious and learned reader will, however, here and

there, meet with the first traces of ideas, opinions or discoveries, which scarcely acquired a shape, even in the mind of the writer, till some time afterwards. If on the one hand the Journal may seem defective in communicating information, the occasional quotations, references and allusions, the familiar and sufficiently correct use of the Latin language, and the general accuracy of the whole, give a very high idea of the author's accomplishments. The extemporaneous journals of the most illustrious travellers, made without a single book to refer to, or a companion to consult, would few of them perhaps stand the test of criticism so well.

To render the translation fit for the public view, the editor found himself

under the necessity of writing the whole over; but in doing this, though often obliged to supply the forms of whole sentences, of which only hints or cyphers exist in the manuscript, he has been careful to give as literal a translation of the rest as the materials would allow. This principle ever kept in view, and the difficulty of the undertaking, which, small as the book is, has taken up much of his time for seven years past, must apologize for any inelegancies of composition. Yet in many parts the original displays a natural and striking eloquence, of which the translation may possibly fall short. Such passages, when they occurred, repaid the labour and perplexity of studying for hours to decypher some obscure mark, or some ill-written Swedish or

Latin word, which the original translator had given up in despair.

The sketches with a pen, that occur plentifully in the manuscript, are not the least curious part of the whole. They are often necessary to explain descriptive passages in the work, and about sixty of them have been selected to illustrate the book. These have been cut in wood, with such admirable precision, that every stroke of the pen, even the most casual, is retained, and it is but justice to the artist, Mr. R. T. Austin, to record his name. Several plants, but rudely sketched in this manuscript, being more completely represented in the *Flora Lapponica*, it was thought unnecessary to publish such figures, except a few, for the sake of curiosity, or of particular illustration.

The notes are entirely supplied by the editor. Every name or remark that he has added to the text, is scrupulously inserted between crotchets; nor is there, throughout the whole, any one passage or word of the original author's so inclosed.

The "Brief Narrative," subjoined to the Journal, having been drawn up by Linnæus himself, to lay before the Academy of Sciences at Upsal, could not with propriety be omitted. Part of it throws great light on the body of the work; and though there are some repetitions, there is little that can be thought superfluous.

Norwich, April, 1811.

JOURNEY

TO

LAPLAND.

HAVING been appointed by the Royal Academy of Sciences to travel through Lapland, for the purpose of investigating the three kingdoms of Nature in that country, I prepared my wearing apparel and other necessaries for the journey as follows.

My clothes consisted of a light coat of Westgothland linsey-woolsey cloth without folds, lined with red shalloon, having small cuffs and collar of shag; leather breeches; a round wig; a green leather cap, and a pair of half boots. I carried a small leather bag, half an ell in length, but somewhat less in breadth, furnished on one side with hooks and eyes, so that it could be

opened and shut at pleasure. This bag contained one shirt; two pair of false sleeves; two half shirts; an inkstand, pencase, microscope, and spying-glass; a gauze cap to protect me occasionally from the gnats; a comb; my journal, and a parcel of paper stitched together for drying plants, both in folio; my manuscript Ornithology, *Flora Uplandica*, and *Characteres generici*. I wore a hanger at my side, and carried a small fowling-piece, as well as an octangular stick, graduated for the purpose of measuring. My pocket-book contained a passport from the Governor of Upsal, and a recommendation from the Academy.

May 12, 1732, old style.

I set out alone from the city of Upsal on Friday May 12, 1732, at eleven o'clock, being at that time within half a day of twenty-five years of age.

At this season Nature wore her most cheerful and delightful aspect, and Flora celebrated her nuptials with Phœbus.

Omnia vere vigent et veris tempore florent,
Et totus fervet Veneris dulcedine mundus.

Spring clothes the fields and decks the flowery grove,
And all creation glows with life and love.

Now the winter corn was half a foot in height, and the barley had just shot out its blade. The birch, the elm, and the aspen-tree began to put forth their leaves.

Upsal is the ancient seat of government. Its palace was destroyed by fire in 1702. With respect to situation, and variety of prospects, scarcely any city can be compared with this. For the distance of a quarter of a Swedish mile it is surrounded with fertile corn-fields, which are bounded by hills, and the view is terminated by spacious forests.

I had no sooner passed the northern gate of the city than I perceived signs of a clay soil, except in the hills, which consist of sand and stones. The road here is level, and for a quarter of a mile destitute of

trees. In ditches by the way side the Water Byssus was observable (*Byssus Flos aquæ*), particularly in places sheltered from the wind. It greatly resembles the cream of milk, and is called by the peasants *Watnet blommar*, or Water Flower.

A number of mares with their colts were grazing every where near the road. I remarked the great length of the young animals' legs, which according to common opinion are as long at their birth as they ever will be; therefore if a measure be taken from the hoof up to the knee of a young colt, and so on from the knee to the extremity, it will give the height of the horse when full grown. A similar observation has been made on the size of the bones in the ear of an infant.

I observed the same kind of moss, or rather *Lichenoides terrestre, dædaleis sinubus*, (*Lichen nivalis*,) which is found on the hill near the palace at Upsal.

Geese were now accompanied by their

goslings, which are all uniformly of the same yellow hue when hatched, whatever colour they may acquire afterwards.

I left old Upsal on the right, with its three large sepulchral mounds or *tumuli*.

The few plants now in flower were *Taraxacum* (*Leontodon Taraxacum*), which Tournefort erroneously combines with *Pilosella* (*Hieracium Pilosella*), notwithstanding the reflexed leaves of its calyx; *Draba caule nudo* (*D. verna*), which in Smoland is called Rye Flower, because as soon as the husbandman sees it in bloom he is accustomed to sow his Lent corn; *Myosotis scorpioides*; *Viola tricolor* and *odorata*; *Thlaspi arvense*; *Lithospermum arvense*; *Cyperoides* (probably some species of *Carex*); *Juncoides* (*Juncus campestris*); *Salix* (*S. caprea?*); *Primula veris*, as it is called, though neither here nor in other places the first flower of the spring; *Caltha palustris*, known by the name of Swedish Caper, as many people are said to eat it

instead of the true Caper; the report of its giving a colour to butter is certainly false.

The lark was my companion all the way, flying before me quivering in the air.

Ecce suum tirile, tirile, suum tirile tractat.*

The weather was warm and serene. Now and then a refreshing breeze sprang up from the west, and a rising cloud was observable in that quarter.

Okstad (more properly Högsta) is a mile and a quarter from Upsal. Here the forests began to thicken. The charming lark, which had till now attended my steps, here left me; but another bird welcomed my approach to the forest, the Red-wing, or *Turdus iliacus*, whose amorous warblings from the tops of the Spruce Fir were no less delightful. Its lofty and varied notes rival those of the Nightingale herself.

* "The lark that tirra-lirra chaunts."
Shakspear's Winter's Tale.

In the forest innumerable dwarf Firs are to be seen, whose diminutive height bears no proportion to their thick trunks, their lowermost branches being on a level with the uppermost, and the leading shoot entirely wanting. It seems as if all the branches came from one centre, like those of a palm, and that the top had been cut off. I attribute this to the soil, and could not but admire it as the pruning of Nature. This form of the Fir has been called *Pinus plicata*.

Läby is a mile and a quarter further. Here the forest abounds with the Red Spanish Whortle-berry (*Arbutus Uva Ursi*), which was now in blossom, and of which, as it had not been scientifically described, I made a description; (see *Flora Lapponica*; and *Engl. Bot. t.* 714.)

A large and dreary pine-forest next presented itself, in which the herbaceous plants seemed almost starved, and in their place the soil, which was hardly two inches deep, all below that depth being pure barren sand (*Arena Glarea*), bore Heath (*Erica*),

Hypnum parietinum, and some Lichens of the tribe called *coralloides*.

Above a quarter of a mile beyond the post-house, near the road, is a Runic monument; but I did not allow myself time to copy the inscription, finding it had lately been decyphered by somebody else.

A quarter of a mile further stands a land-mark of a curious construction, consisting of four flattish upright stones placed in a square, with a fifth in their centre.

I discovered a large stone of the kind called *Ludus Helmontii**, and, wishing to break it, I took a smaller stone, which proved to be of the same kind. My endeavours were vain as to the former; but the small one broke into many fragments, and proved to contain minute prismatic crystals, which were quite transparent; some white, others of a deep yellow.

Before the next post-house, I noticed on the right a little farm, and on the other

* So I understand the original, which is *Lapis marmoreus polyzonos*.

side of the way a small ditch used to wash in. Here stood a plain sloping stone of white granite, in which were three large dark-grey squares, seeming to have been inlaid by a skilful stone-cutter. It was evident, however, on examining one end, that they were continued through the whole substance of the stone.

Opposite to Yfre is a little river, the water of which would at this time have hardly covered the tops of my shoes, though the banks are at least five ells in height. This has been occasioned either by the water continually carrying away the loose sand, or, as I am more inclined to believe, the quantity of water is less than it has been.

Chrysosplenium (*alternifolium*) was now in blossom. Tournefort defines it *foliis auriculatis*, but erroneously, as the leaves are all separate and distinct*. It has eight

* Tournefort by this definition probably meant to compare the shape of the leaves, with the ears of some animal. In the criticism of Linnæus respecting the

stamens, placed in a quadrangular position, and two pistils. Thus it evidently approaches nearer to the *Saxifragæ*, as former botanists have justly thought, than to the *campaniformes*, or flowers with a monopetalous corolla.

At Yfre, two miles further, I noticed young kids, under whose chins, at the commencement of the throat, were a pair of tubercles, like those sometimes seen in pigs, about an inch long, of the thickness of their mother's nipples, and clothed with a few scattered hairs. Of their use I am ignorant.

Near the church of Tierp runs a stream, whose bank on the side where it makes a curvature is very high and steep, owing to timber placed close to the water. The great power of a current, and the way in

natural affinity of this plant, we may observe how his own system, professedly artificial, and yet so affectedly despised by some botanists for not being natural, led him to the real truth. In fact, some truth is to be learnt from every system and every theory, but perfection is not to be expected from any one.

which it undermines the ground, is exceedingly visible at this place. Hence the strongest earthen ramparts, made with the greatest expense and labour, are often found insufficient to secure the foundations of large palaces or churches in some situations. But where timber has been used, the attacks of water are little to be dreaded. On both sides of the church were several small sepulchral mounds. It now grew late, and I hastened to Mehede, two miles and a half further, where I slept.

May 13.

Here the Yew (*Taxus baccata*) grows wild. The inhabitants call it Id or Idegran.

The forest abounded with the Yellow Anemone (*Anemone ranunculoides*), which many people consider as differing from that genus. One would suppose they had never seen an Anemone at all. Here also grew Hepatica (*Anemone Hepatica*) and Wood Sorrel (*Oxalis Acetosella*). Their blossoms were all closed. Who has endowed plants

with intelligence, to shut themselves up at the approach of rain? Even when the weather changes in a moment from sunshine to rain, though before expanded, they immediately close. Here for the first time this season I heard the Cuckoo, a welcome harbinger of summer.

Having often been told of the cataract of Elf-Carleby, I thought it worth while to go a little out of my way to see it; especially as I could hear it from the road, and saw the vapour of its foam, rising like the smoke of a chimney. On arriving at the spot, I perceived the river to be divided into three channels by a huge rock, placed by the hand of Nature in the middle of its course. The water, in the nearest of these channels, falls from a height of twelve or fifteen ells, so that its white foam and spray are thrown as high as two ells into the air, and the whole at a distance appears like a continual smoke. On this branch of the cascade stands a saw-mill. The man employed in it had a pallid countenance, but he did not

complain of his situation so much as I should have expected.

It is impossible to examine the nature of the inaccessible black rock over which the water precipitates itself.

Below this cataract is a salmon fishery. A square net, made of wicker work, placed at the height of an ell above the water, is so constructed that the salmon when once caught cannot afterwards escape.

Oak trees grow on the summits of the surrounding rocks. At first it seems inconceivable how they should obtain nourishment; but the vapours are collected by the hills above, and trickle down in streams to their roots.

In the valleys among these hills I picked up shells remarkable for the acuteness of their spiral points. Here also grew a rare Moss of a sulphur-green colour*.

From hence I hastened to the town of

* This appears to have been *Bartramia pomiformis*, *Bryum pomiforme* of Linnæus. See *Fl. Lapp n.* 400.

Elf-Carleby, which is divided into two parts by the large river, whose source is at Lexan in Dalecarlia. The largest portion of the town stands on the southern side, and contains numerous shops, occupied only during the fairs occasionally kept at this place.

I crossed the river by a ferry, where it is about two gun-shots wide. The ferryman never fails to ask every traveller for his passport, or license to travel. At first sight this man reminded me of Rudbeck's Charon, whom he very much resembled, except that he was not so aged. We passed the small island described by that author as having been separated from the main land in the reign of king John III. It is now at a considerable distance from the shore, the force of the current rendering the intermediate channel, as Rudbeck observes, every year wider. The base of the island is a rock. Only one tree was now to be seen upon it.

The northern bank of the river is nearly perpendicular. I wondered to see it so

neat and even, which may probably be owing to a mixture of clay in the sand; or perhaps it may have been smoothed by art. Horizontal lines marked the yearly progress of the water. The sun shone upon us this morning, but was soon followed by rain.

Elf-Carleby is two miles and a half further. On its north side are several sepulchral mounds.

Here for the first time I beheld, what at least I had never before met with in our northern regions, the *Pulsatilla apii folio* (*Anemone vernalis*), the leaves of which, furnished with long footstalks, had two pair of leaflets besides the terminal one, every one of them cut half way into four, six or eight segments. The calyx, if I may be allowed so to call it, was placed about the middle of the stalk, and was cut into numerous very narrow divisions, smooth within, very hairy without. Petals six, oblong; the outermost excessively hairy and purplish; the innermost more purple and less hairy; all

of them white on the inside, with purple veins. Stamens numerous and very short. Pistils cohering in a cylindrical form, longer than the stamens, and about half as long as the petals.

We had variable weather, with alternate rain and sunshine.

A mile from Elf-Carleby are iron works called Härnäs. The ore is partly brought from Danemora in Roslagen, partly from Engsiö in Sudermannia. These works were burnt down by the Russians, but have since been repaired.

Here runs the river which divides the provinces of Upland and Gestrickland. The soil hereabouts is for the most part clayey. In the forests it is composed of sand (*Arena mobilis* and *A. Glarea*). The post-houses or inns are dreadfully bad. Very few hills or lakes are to be met with in Upland. When I had passed the limits of these provinces, I observed a few oak trees only in the district of Medelpad.

GESTRICKLAND.

THE forests became more and more hilly and stony, and abounded with the different species of Winter-green (*Pyrolæ*).

All along the road the stones were in general of a white and dark-coloured granite.

I noticed great abundance of the Rose Willow (*Salix Helix*), which had lost all its leaves of the preceding season, except such as composed rosaceous excrescences at the summits of its branches, and which looked like the calyx of the *Carthamus* (*Safflower*), only their colour was gone.

Near Gefle stands a Runic monumental stone, rather more legible than usual, and on that account more taken care of.

I noticed a kind of stage to dry corn and pease on, formed of perpendicular posts with transverse beams. It was eight ells in height. Such are used throughout the northern provinces, as Helsingland, Medelpad, Angermanland, and Westbothland.

May 14.

I left Gefle after divine service, having previously obtained a proper passport from the governor of the province and his secretary. I was well received and entertained by the Comptroller of the Customs, Lönbom.

At this town is the last apothecary's shop and the last physician in the province, neither the one nor the other being to be met with in any place further north. The river is navigable through the town. The surrounding country abounds with large red stones.

At the distance of three quarters of a mile stands Hille church. Here begins a chain or ridge of hills extending to the next post-house, three quarters of a mile further, and separating two lakes. On its summit, a quarter of a mile from Gefle, a number of different sepulchral mounds are observable, composed of stones.

The Fir trees here all appeared tall and

slender, and were laden with cones of three different stages of growth; some a year old, not larger than large peas, and of a globular figure; others two years old, ovate and pointed; and the remainder ripe, with their scales open and reflexed, having been four years on the tree.

In the marshes on the left the note of the Snipe (*Scolopax Gallinago*) was heard continually.

At the distance of a quarter of a mile before we come to Troye, on the right, are the mineral springs of Hille.

Troyè post-house, which Professor Rudbeck the elder used to call Troy, is surrounded by a smooth hill.

The road from hence lay across a marsh called by the people the walls of Troy, a quarter of a mile in extent, destitute of large trees. The Sweet Gale (*Myrica Gale*), laden with catkins about its upper branches, was abundant every where, as well as the Dwarf Birch (*Betula nana*). These form a sort of low alley through

which the road leads. This *Betula* had also catkins upon it, which are sessile and erect, not pendulous as in the Common Birch, about half an inch long and as thick as a goose-quill, situated about the lower part of the branches. The female catkins are more slender than the male, erect, and sessile upon the upper branches. Their scales ovate and almost leafy, green, pointed, three-cleft, with three pair of purplish pistils. Here and there grew the Marsh Violet (*Viola palustris*), with its pale grey flowers, marked with five or seven black forked lines on the lower lip.

In the forest on the other side of this marsh were many kinds of Club-moss (*Lycopodium clavatum*, *Selago*, *alpinum*, and *complanatum*).

A quantity of large stones lay by the road side, which the governor of the province had caused to be dug up in order to mend the high-way. They looked like a mass of ruins, and were clothed with *Campanula serpyllifolia* (the plant afterwards

called *Linnæa borealis*), whose trailing shoots and verdant leaves were interwoven with those of the Ivy (*Hedera Helix*).

On the right is the lake Hamränge Fjärden, which adds greatly to the beauty of the road.

The morning of this day was bright, but the afternoon was diversified with sunshine and rain, like the preceding. The wind however changed from north to south.

On the mountainous ridge at Hille, above described, I remarked on the ends of the Juniper-branches a kind of bud or excrescence, consisting of three leaves, longer than when in their natural state, and three or four times as broad, which cohered together except at their tips. They enveloped three smaller leaves, of a yellow hue, in the centre of which lodged either a maggot or a whitish chrysalis. (This produces the *Tipula Juniperi*. See *Fauna Suecica* 438, and *Fl. Suec.* 360).

I arrived at Hamränge Post-house during the night.

The people here talked much of an extraordinary kind of tree, growing near the road, which many persons had visited, but none could find out what it was. Some said it was an apple tree which had been cursed by a beggar-woman, who one day having gathered an apple from it, and being on that account seized by the proprietor of the tree, declared that the tree should never bear fruit any more.

May 15.

Next morning I arose with the sun in order to examine this wonderful tree, which was pointed out to me from a distance. It proved nothing more than a common Elm. Hence however we learn that the Elm is not a common tree in this part of the country.

I observed that in these forests plants of the natural family of *bicornes* (with two-horned antheras) predominated over all others, so that the Heath, *Erica*, in the woods, and

*Andromeda**, in the marshes, were more abundant than any thing else. Indeed we meet with few other plants than *Vaccinium Myrtillus* and *Vitis-Idæa*, *Arbutus Uva-Ursi*, *Ledum palustre*, &c. The same may be said of the upper part of Lapland.

The spiders had now spread their curious mathematical webs over the pales and fences, and they were rendered conspicuous by the moisture with which the fog had besprinkled them.

The Red-wing (*Turdus iliacus*), the Cuckoo (*Cuculus canorus*), the Black Grous (*Tetrao Tetrix*), and the Mountain Finch (*Fringilla Montifringilla*), with their va-

* It is a curious circumstance that Linnæus in his MS. here has the word *Daphne;* but his remark is not in any respect applicable to that genus, and he evidently can mean only *Andromeda polifolia*. He had not as yet named either of these genera in print. The origin of *Andromeda* will be explained hereafter, and the fanciful idea which gave rise to it had not perhaps at this time occurred. He therefore now either intended to call this plant *Daphne*, or he accidentally wrote one name by mistake for the other, having both in his mind.

rious notes made a concert in the forest, to which the lowing herds of cattle under the shade of the trees formed a base. The weather this morning was delightfully pleasant.

Lichen islandicus grows abundantly in this forest.

After travelling about a mile and half from Hamränge I arrived at the river Tonna, which divides Gestrickland from Helsingland, and empties itself into the bay of Tonna. The abovementioned lake, called by the inhabitants Hamränge Fjärden, extends almost to the sea. I was told it did actually communicate with the ocean. At least there is a ditch in the mountain itself, whether the work of art or nature is uncertain, called the North Sound, hardly wide enough to admit a boat to pass. This is dammed up as soon as the hot weather in summer sets in, to prevent the lake losing too much water by that channel, as the iron from several founderies is conveyed by the navigation through this lake.

HELSINGLAND.

I HAD scarcely travelled a quarter of a mile beyond the river when I observed a red earth close to the road, which promises to be very useful in painting, if it should prove sufficiently plentiful, and capable of being cleansed from its impurities. The people at the next post-house informed me that the same earth, but of a much better quality, was found in the parish of Norrbo.

The Common and Spruce Firs (*Pinus sylvestris* and *P. Abies*) grow here to a very large size. The inhabitants had stripped almost every tree of its bark.

A number of small white bodies were hanging on the plants of Ling (*Erica*), of a globular form, but cut off, as it were, though not open, on the lower side, each about the size of a Bilberry (*Vaccinium Myrtillus*), and consisting of a thin white silky membrane. A small white insect was lodged within.

There were also affixed to some plants

ovate white bodies of a silky texture, apparently formed of innumerable silky threads. These contained each a small insect.

A little further on I observed close to the road a rather lofty stone containing in its substance large fragments of *mica*.

At last to my great satisfaction I found myself at the great river Liusnan. From this part of the forest to the sea the distance is three miles. Here and there in the woods lay blood-red stones, or rather stones which appeared to have been partially stained with blood. On rubbing them I found the red colour merely external, and perfectly distinct from the stone itself. It was in fact a red Byssus (*B. Jolithus*).

Many sepulchral mounds are in this neighbourhood.

Not far from Norrala, situated about a mile from the last post-house, the water in the ditches deposits a thick sediment of ochre.

Several pair of semicircular baskets made of wicker work were placed in the water,

intended principally to catch Bream (*Cyprinus Brama*). Here I observed the Lumme, or Black-throated Diver (*Colymbus arcticus*), which uttered a melancholy note, especially in diving.

From Norrala I proceeded to Enänger, through a heavy fog, as it had rained violently while I rested at the former place. Towards evening it thundered and lightened. In the course of this whole day's journey I observed a great variety in the face of the country as well as in the soil. Here are mountains, hills, marshes, lakes, forests, clay, sand, and pebbles.

Cultivated fields indeed are rare. The greater part of the country consists of uninhabitable mountainous tracts. In the valleys only are to be seen small dwelling-houses, to each of which adjoins a little field. Even in these there is no great proportion of fertile land, the principal part being marshy.

The people seemed somewhat larger in stature than in other places, especially the

men. I inquired whether the children are kept longer at the breast than is usual with us, and was answered in the affirmative. They are allowed that nourishment more than twice as long as in other places. I have a notion that Adam and Eve were giants, and that mankind from one generation to another, owing to poverty and other causes, have diminished in size. Hence perhaps the diminutive stature of the Laplanders*.

Brandy is not always to be had here. The people are humane and civilized. Their houses are handsome externally, as well as neat and comfortable within; in which respects they have the advantage of most other places.

* The original is very obscure, and I have been obliged partly to guess at the sense of the intermingled Latin and Swedish. I beg leave to suggest that the deficiency of brandy among this sequestered people is perhaps a more probable cause of their robust stature, and even of their neatness and refinement, than that assigned by Linnæus.

The old tradition, that the inhabitants of Helsingland never have the ague, is without foundation. In every parish where I made the inquiry I found many persons who had had that disorder, which appears to be not unfrequent among them.

Here were plenty of Mountain Finches (*Fringilla Montifringilla*); but, what is remarkable, they were all males, known by the orange-coloured spot on the breast.

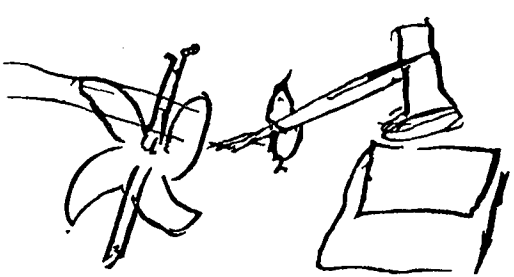
May 16.

Between Eksund post-house and Spange is the capital iron forge of Eksund, which has two hammers and one blast furnace. The sons of Vulcan were working in their shirts, and seemed masters of their business. The ore used here is of three or four kinds. First, from Dannemora; second, from Soderom; third, from Grusone, which contains beautiful cubical pyrites; fourth, a black ore from the parish of Arbro, which lies at the bottom of the sea, but in stormy weather is thrown upon the shore. At this place, as well as

further north in the same district, a kind of blueish stone* is used for building the tunnels or chimneys, which is considered as more compact and better able to resist heat than *Lapis molaris* or *Pipsten* (*Cos molaris ?*). The limestone placed between the other stones was procured from the sea shore, and abounded with petrified corals.

Granite, I believe, of all the different kinds existing in the world, abounds every where in the forests.

In every river a wheel is placed, contrived to lift up a hammer for the purpose of bruising flax.



* Probably *Saxum fornacum*, *Linn. Syst. Nat. ed.* 12. *v.* 3. 79.

When it is not wanted, a trap door is raised, to turn the stream aside.

Several butterflies were to be seen in the forest, as the common black, and the large black and white. Here I noticed *Lichenoides terrestre scutatum albicans*, (*Lichen arcticus*), which has larger fructification than the common *L. caninus*, with which it agrees in other respects, except colour. (See Linnæus's opinion respecting this Lithen, in which however he is certainly mistaken, in *Fl. Lapponica n.* 442.)

By the road side between Nieutænger and Bringstad, a violet-coloured clay, used in building bridges, is here and there to be met with.

On a wall at Iggsund I found a nondescript hemipterous insect. (What this was cannot now be ascertained.)

Between the post-house of Iggsund and Hudwiksvall the abovementioned violet-coloured clay is found in abundance, forming a regular stratum. I observed it like-

wise in a hill near the water which was nine ells in height.

The strata of this hill consisted of two or three fingers' breadths of common vegetable mould; then from four to six inches of barren sand (*Arena Glarea*); next about a span of the violet clay; and lastly barren sand. The clay contained small and delicately smooth white bivalve shells, quite entire, as well as some larger brown ones, of which great quantities are to be found near the water side. I am therefore convinced that all these valleys and marshes have formerly been under water, and that the highest hills only then rose above it. At this spot grows the *Anemone Hepatica* with a purple flower; a variety so very rare in other places, that I should almost be of the opinion of the gardeners, who believe the colours of particular earths may be communicated to flowers.

I observed that the mountains, after the trees and plants had been burnt upon them,

were quite barren, nothing but stones remaining.

The produce of the arable land here being but scanty, the inhabitants mix herbs with their corn, and form it into cakes two feet broad, but only a line in thickness, by which means the taste of the herbs is rendered less perceptible.

Hudvikswall is a little town situated between a small lake and the sea.

Near this place the Arctic Bramble (*Rubus arcticus*) was beginning to shoot forth, while *Lychnis dioica* and *Arabis thaliana* were in flower.

The larger fields here are sown with flax, which is performed every third year. The soil is turned up by a plough, and the seed sown on the furrow; after which the ground is harrowed. The linen manufactory furnishes the principal occupation of the inhabitants of this country.

Towards evening I reached Bringstad. The weather was fine, it having rained but once in the course of the day.

May 17.

Continuing my journey at sunrise, I saw some sepulchral mounds near the church of Jättedahl. As soon as I had passed the forest, I overtook seven Laplanders driving their reindeer, which were about sixty or seventy in number followed by their young ones. Most of the herd had lost their horns, and new ones were sprouting forth. I asked the drivers what could have brought them so far down into the country. They replied that they were born here near the sea coast, and intended to end their lives here. They spoke good Swedish.

Near the post-house at Gnarp, to the westward, grows a birch tree, with more than fifty or sixty of those singularly matted and twisted branches which this tree sometimes produces.

MEDELPAD.

BETWEEN Gnarp and the post-house of Dingersjö stands the boundary mark between Helsingland and Medelpad or Medelpadia, consisting of two posts, one on each side the road. Here I began to perceive the common Ling, *Erica*, to grow more scarce, its place being supplied by a greater quantity of the Bilberry (*Vaccinium Myrtillus*). Birch trees became more abundant as I advanced. On the left of the road are large mountains of granite. At the foot of those rocks the whole country was covered with stones, about twice as large as a man's fist, of a greyish green colour, lying in heaps, and covered with a fine coating of moss, seeming never to have been disturbed.

I had scarcely passed the limits of Helsingland, when I perceived a brace of Ptarmigans (*Tetrao Lagopus*) in the road, but could not get near enough to fire at them. Viewed through my spying-glass, they

appeared for the most part of a reddish cast, but the wing feathers were snow-white.

Close by the post-house of Dingersjö grew the large Yellow Aconite (*Aconitum lycoctonum*), called by the peasants Giske or Gisk. All over the country through which I passed this day, it is as common as heath or ling. Not being eaten by any kind of cattle, it grows luxuriantly, and increases abundantly, in proportion as other herbs are devoured. Thus Nature teaches the brute creation to distinguish, without a preceptor, what is useful from what is hurtful, while man is left to his own inquiries.

To the north of Dingersjö, on the right hand of the road, stands a considerable mountain called Nyæckers-berg, the south side of which is very steep. The inhabitants had planted hop-grounds under it. As the hop does not in general thrive well hereabouts, they designed that this mountain should serve as a wall for the plants to run upon. They were not disappointed as to

the success of their plantations; for the hops were very thriving, being sheltered from the cold north wind, and at the same time exposed to the heat of the sun, whose rays are concentrated in this spot as in a focus.

At the distance of a quarter of a mile from the post-house, on the left, stands the highest mountain in Medelpad, according to the inhabitants, which is called Norby Kullen, or more properly Norby Knylen. It is indeed of a very considerable height; and being desirous of examining it more minutely, I travelled to Norby, where I tied my horse to an ancient Runic monumental stone, and, accompanied by a guide, climbed the mountain on its left side. Here were many uncommon plants, as *Fumaria bulbosa minima*, *Campanula serpyllifolia* (*Linnæa borealis*), *Adoxa moschatellina*, &c., all in greater perfection than ever I saw them before. I found also a small rare moss which I should call *Sphagnum ramosum*, *capsulis globosis*,

petiolis (pedicellis) *longis erectis*, if it may be presumed a *Sphagnum*, as I saw no calyptra. The little heads or capsules were exactly spherical*.

After much difficulty and fatigue, we reached the summit of the mountain to the westward. Here the country-people kept watch during the war with the Russians, and were obliged to attend twice a day, as this place commands an extensive sea view. They had collected a great quantity of wood, on which stood a pole, with a tar-barrel placed transversely on its top. This was to be set on fire at the landing or approach of the enemy, being conspicuous for many miles around.

I brought away with me a stone, which seemed of a very compound kind. Every sort of moss grows on this mountain, that can be found any where in the neighbouring country. The trees towards the upper

* Linnæus's ideas concerning the genera of Mosses were at this time in a very unsettled state. Could this be any thing else than *Bartramia pomiformis ?*

part were small, but some of considerable dimensions grew about the sides of the hill.

When at the summit, we looked down on the country beneath, varied with plains and cultivated fields, villages, lakes, rivers, &c. We saw the appearance of a smoke between us and the lower part of the mountain, which was not perceptible as we descended, being a slight mist or exhalation from the ground. The dung of the hare was observable all over the very highest part of the hill; a certain proof of that animal's frequenting even these lofty regions.

We endeavoured to descend on the south side, which was the steepest, and where rocks were piled on rocks. We were often obliged to sit down, and in that position to slide for a considerable way. Had we then met with a loose fragment of rock, or a precipice, our lives had been lost. About the middle of this side of the mountain, an Eagle Owl (*Strix Bubo*) started up suddenly before us. It was as large as

a hen, and the colour of a woodcock, with black feathery ears or horns, and black lines about the bill. I wished for my gun, which I had left, finding it too troublesome to carry up the hill. Immediately afterwards we perceived a little plat of grass, fronting the south, and guarded, as it were, with rocky walls on the east and west, so that no wind but from the south could reach it. Here were three young birds and a spotted egg*. Of these birds one was as large as two fists, healthy and brisk, clothed all over with very soft long whitish feathers like wool. This we took away with us to the house. The other two were but half as large. The egg fell to pieces as I took it up, and contained only a small quantity of a thin watery fluid, the abominable smell of which I shall not venture to describe, lest I

* So I interpret Linnæus's cypher in this and another place, which is *ovum* ⊡ *sum*, (ovum maculosum). If I am wrong, the candid reader will rather compassionate than condemn me; yet Linnæus says, a little further on, that the egg was white.

should excite as much disgust in my readers as in myself. I believe the two smaller birds were the offspring of the Eagle Owl. Close to the nest lay a few small bones, of what animal I am ignorant. These birds were all quite full fed. Near them was a large dead rat, of which the under side was already putrefied and full of maggots. I verily believe that these young birds cannot digest flesh, but are obliged to wait till it decays and affords them maggots and vermin. Their bills and cere were black. The egg was almost globular, white, the size of that of a guinea-hen.

Here and there among the rocks small patches of vegetation were to be seen, full of variety of herbaceous plants, among others the Heart's Ease, *Viola tricolor**, of which some of the flowers were white; others blue and white; others with the

* More probably, from the place of growth, as well as the description, *Viola lutea* of *Fl. Britannica*, and *English Botany*, *vol.* 11. *t.* 721.

upper petals blue and yellow, the lateral and lower ones blue; while others again had a mixture of yellow in the side petals. All these were found within a foot of each other; sometimes even on the same stalk different colours were observable: a plain proof that such diversities do not constitute a specific distinction, and that the action of the sun may probably cause them all. There could scarcely be a more favourable place for vegetation than this, exposed to the sun, sheltered from the cold, and moderately watered by little rills which trickled down the mountain.

Leaving this mountain, and proceeding further on my journey, I observed by the road a large reddish stone, full of glittering portions of talc. The greater part of my way lay near the sea shore, which was bespread with the wrecks of vessels. How many prayers, sighs and tears, vows and lamentations, all alas in vain! arose to my imagination at this melancholy spectacle!

It brought to my mind the student*, who in going by sea from Stockholm to Abo had experienced so severely the terrors of the deep, that he rather chose to walk back to Stockholm through East Bothnia, Tornea, West Bothnia, &c., than trust himself again to so cruel and treacherous a deity as Neptune.

Towards evening I reached Sundswall, a town situated in a small spot between two high hills. On one side is the sea, into which a river discharges itself at this place.

About sunset I came to Finstad, but continued my route the same evening to Fjähl, where I was obliged to pass a river by two separate ferries, the stream being divided by an island.

* This was Tillands, afterwards Professor at Abo, who hence assumed this surname, expressive of his attachment to land, and Linnæus named in honour of him a plant which cannot bear wet. See his *Ord. Nat.* 291.

May 18.

Being Ascension day, I spent it at this place, partly on account of the holiday, partly to rest my weary limbs and recruit my strength.

The country bears a great resemblance to Helsingland, but is rather a more pleasant residence.

I took a walk about the neighbourhood to amuse myself with the beauties of Flora, which were here but in their earliest spring. I found an aquatic Violet with a white flower, which very much resembled the large wild Violet (*Viola canina*), of which I should have taken it for a variety had I not compared them together. It always grows near the water. The odd petal, or lip, is always more or less of a blueish colour; the rest whitish, generally indeed quite white*. Close to this grew the little

* Linnæus appears to have neglected to describe this *Viola* in his printed works. May it not be *V. lactea, Fl. Brit.* 247. *Engl. Bot. vol.* 7. *t.* 445?

Marsh Violet, mentioned some time since, (*V. palustris*, see *p.* 20,) but here it was remarkable for a purplish tinge; (*V. palustris β Fl. Brit.* ?)

This evening it rained very hard.

May 19.

On the following morning I arose with the sun, and took leave of Fjähl. Having proceeded about a quarter of a mile, I came within sight of the next church, called Hasjö. Here I turned to the left out of the main road, to examine a hill where copper ore was said to be found. The stones indeed had a glittering appearance, like copper ore; but the pyrites to which that was owing were of a yellowish white, a certain indication of their containing chiefly iron. Some stones of a blackish colour lay about this hill, decomposed by the action of the air. An opening not more than six feet in breadth, and as much in depth, was the only examination that had as yet

been made into this mine. The mountain is named Balingsberget.

Not far distant, close to the church on the north-east, a huge stone is to be seen. The credulous vulgar relate that, when the church was building, some malignant beings of gigantic size were desirous of knocking it down, but the stones thrown for that purpose fell short of the sacred spot. As a confirmation of this history, they show the evident marks of four huge fingers and a thumb on the upper side of the stone.

In approaching the next large mountain, called Brunaesberget, I turned towards the left, and found a cave, formed by Nature in the mountain itself, resembling an artificial dwelling. The sides, end and roof were all of stone. The front was open, but much narrower and lower than the inside, which was so lofty that I could not reach the roof. The entrance was concealed on the outside by two large trees, a fir and a birch, and the descent was pretty steep. On the floor lay some burnt stumps of

trees. The neighbouring people informed me that a criminal had concealed himself for two years in this cavern, its situation being so retired, and the approach from the road so well fortified by stones piled on stones, that he remained entirely undiscovered.

On the roof and sides of this cave, near the entrance, the stones were clothed with a fungous substance, like a sponge in texture, without any regular form; or rather like the internal medullary part of the Agaric of the Birch, when dressed for making tinder. It appeared to me quite distinct from all plants hitherto described. (This is the *Byssus cryptarum*; *Linn. Fl. Lapp. n.* 527, and *Fl. Suec. n.* 1181. Succeeding travellers have gathered it here.)

Every where near the road lay spar full of talc, or Muscovy glass, glittering in the sun.

Now we take leave of Medelpad and its sandy roads, as well as its Yellow Aconite (*Aconitum lycoctonum*), both which it affords in common with Helsingland.

ANGERMANLAND.

About a quarter of a mile from the next post-house is a small bridge, over a rivulet which joins two little lakes. This water separates Medelpad from Angermanland. We no sooner enter this district, than we meet with lofty and very steep hills, scarcely to be descended with safety on horseback.

Very near Hernosand, in the territories of the bishopric, I picked up a number of Chrysomelas of a blueish green and gold. (These were the beautiful *Chrysomela graminis*. See *Faun. Suec. n.* 509.)

The city of Hernosand is situated about half or three quarters of a mile within the borders of the province, standing on an island, accessible to ships on every side, except at Vaerbryggan, where they can scarcely pass.

In the heart of the Angermannian forests trees with deciduous leaves, *Betula alba* and the hoary-leaved Alder (*Betula incana*),

abound equally with the Common and Spruce Firs (*Pinus sylvestris* and *Abies*), while among the humble shrubs the Heath (*Erica*) and the Bilberry (*Vaccinium Myrtillus*) alternately predominate; the former chiefly on the hills, the latter in the closer parts of the forest.

These hills might with great advantage be cleared of their wood; for here is a good soil remaining wherever the trees are burnt down, not barren stones as in Helsingland and Medelpad. The valleys between the mountains, as in those countries, are cultivated with corn, or laid out in meadows, but here are spacious plains besides.

Every house has near it one of those stages already described, on which the rye, less plentiful here than barley, is laid to dry, as are the peas likewise.

The woods abound with matted branches of the birch, I know not from what cause.

Between Norsby and Veda, on the hill towards Mörtsiön, I had a very extensive view of the surrounding country, which

presented itself like clouds of dense vapour rising one above another. The mountains looked quite blue from the fog which rose from them; and this vapour gave them the appearance of having each a more lofty summit than the hill before it. This was the case in every part of the prospect.

Veda is situated near the great river of Angermanland, which takes its name from the country (*Angermanna Elfven*), and is half a Swedish mile in breadth near its mouth. The water is entirely salt, this being more properly an arm of the sea than a river.

I crossed this water, and, on approaching the opposite shore, observed all along the coast a remarkable line of white froth, an ell broad, carried along with the stream. On inquiring the cause of this, my companions in the boat replied, they knew of no other than that this line was the course of the current of the river.

Near the road, every here and there, were nets for catching fish. These were not

painted black, but coloured red by boiling large pieces of the inner bark of the birch. When this liquor begins to cool, the nets are immersed in it.

May 20.

In some places the cows were without horns; a mere variety of the common kind, and not a distinct species. Nor have they been originally formed thus; for though in them the most essential character of their genus is, as to external appearance, wanting, still rudiments of horns are to be found under the skin. A contrary variety is observable, in Scania and other places, in the ram, which has sometimes four, six or eight horns, that part growing luxuriant to excess, like double flowers.

The forests chiefly consist of the Hoary-leaved Alder. Birch trees here also bear abundance of matted branches. To whatever side I cast my eyes, nothing but lofty mountains were to be seen. Not far from Æssja the little Strawberry-leaved Bramble

(*Rubus arcticus*) was in full bloom. The cold weather, however, had rendered the purple of its blossoms paler than usual. I cannot help thinking that it might more properly and specifically be called *Rubus humilis, folio fragariæ, flore rubro,* than *fructu rubro.* It likewise seems to me, that this plant exactly agrees in structure with the *Rubus folio ribes alpinus anglicus* of authors, which I must compare with it the first opportunity*.

A quarter of a mile further is Doggsta, on the other side of which, close to the road, stands a tremendously steep and lofty mountain, called Skulaberget, (the mountain of Skula,†) in which I was informed there was a remarkable cavern. This I wished

* Linnæus soon satisfied himself that the latter was his *Rubus Chamæmorus.* The *arcticus* is a much more valuable plant for its fruit, which partakes of the flavour of the raspberry and strawberry, and makes a most delicious wine, used only by the nobility in Sweden.

† Its perpendicular height is two hundred Swedish ells. See *Dissert. de Angermanniâ.*

to explore, but the people told me it was impossible. With much difficulty I prevailed on two men to show me the way. We climbed the rocks, creeping on our hands and knees, and often slipping back again; we had no sooner advanced a little, than all our labour was lost by a retrograde motion. Sometimes we caught hold of bushes, sometimes of small projecting stones. Had they failed us, which was very likely to have been the case, our lives might have paid for it. I was following one of the men in climbing a steep rock; but seeing the other had better success, I endeavoured to overtake him. I had but just left my former situation, when a large mass of rock broke loose from a spot which my late guide had just passed, and fell exactly where I had been, with such force that it struck fire as it went. If I had not providentially changed my route, nobody would ever have heard of me more. Shortly afterwards another fragment came tumbling down. I am not sure that the man did

not roll it down on purpose. At length, quite spent with toil, we reached the object of our pursuit, which is a cavity in the middle of the mountain. I expected to have seen something to repay my curiosity, but found a mere cavern, formed like a circle or arch, fourteen Parisian feet high, eighteen broad, and twenty-two long. The stones that compose it are of a very hard kind of quartz or spar, yet the sides of the cavern are in many places as even as if they had been cut artificially. Several different strata are distinguishable, particularly in the roof, which is concave like an arch. In that part a hole appears, intended, as I was told, for a chimney. Whether it is pervious to any extent, I know not. Some convulsion of the mountain seems to have shivered the rock in longitudinal fissures. All the shivers of stone, many of which lie on the floor, are quadrangular, and of a considerable size. I am fully persuaded of this grotto having been formed by the hand of Nature, and that

art had afterwards merely cleared away the fragments of stone. The entrance is sufficiently large to afford a full view of the inside, occupying an eighth part of the whole. Drops of water trickle down from the roof near one of the sides. Some species of *Polypodium*, the *Asplenium Trichomanes*, and other ferns, grow on the adjacent parts of the mountain. Before the orifice of this cavern grew a Sallow tree, which when king Charles XI. passed this way was cut down, and, having grown up again, was a second time felled by the inhabitants*.

Having taken leave of this mountain, I had scarcely continued my journey a quarter of a mile before I found a great part of

* This cavern has been visited by other naturalists since the time of Linnæus, among whom was Dr. Olof Swartz, the present Bergian Professor of Botany at Stockholm, well known by his various excellent publications, who gathered here the same *Byssus* (*cryptarum*) which Linnæus found in the other cavern at Brunæsberget. Both their original specimens are now in my possession.

the country covered with snow, in patches some inches deep. The pretty spring flowers had gradually disappeared. The buds of the birch, which so greatly contribute to the beauty of the forests, were not yet put forth. I saw nothing but wintry plants, the heath and the whortle-berry, peeping through the snow. The high mountains which surround this tract, and screen it from the genial southern and western breezes, added to the thick forests which will hardly allow the first mild showers of spring to reach the ground, may account for the long duration of the snow.

This part of the country is very mountainous, and is watered by many small rills, originating on the sides of the mountains from the copious rains falling upon them, and running from thence, by various channels, to swell the streams of Helsingland and Medelpad.

The cornfields afford a crop two years successively, and lie fallow the third. Rye is seldom or never sown here, being too

slow in coming to perfection, so that the land, which must next receive the Barley, would be too much exhausted. The ploughs are made with two transverse beams on one side, that the sods may be turned the first time the land is ploughed, as will presently be more particularly explained.

May 21.

After going to church at Natra, I remarked some cornfields, which the curate of that place had caused to be cultivated in a manner that appeared extraordinary to me. After the field has lain fallow three or four years, it is sown with one part rye and two parts barley, mixed together. The seed is committed to the ground in spring, as soon as the earth is capable of tillage. The barley grows rank, ripens its ears, and is reaped. The rye in the mean while goes into leaf, but shoots up no stem, as the barley smothers it and retards its growth. After the latter is reaped, the rye advances

in growth, and ripens the year following, without any further cultivation, the crop being very abundant. The corn so produced is called Kappsäd.

Today I met with no flowers, except the Wood Sorrel (*Oxalis Acetosella*), which is here the *primula*, or first flower of the spring. The *Convallaria bifolia* and Strawberry-leaved Bramble (*Rubus arcticus*) were plentifully in leaf.

The rocks are generally of a whitish hue, the uppermost side indeed being rather darker from the injuries of the air, and the minute mosses that clothe it.

The inhabitants make the same kind of broad cakes of bread, which have already been described. The flour used for this purpose commonly consists of one part barley and three of chaff. When they wish to have it very good, and the country is rich in barley, they add but two portions of chaff to one of corn*. The

* How would this *very good* bread suit English stomachs? This *honest* adulteration has not been

cakes are not suffered to remain long in the oven, but require to be turned once. Only one is baked at a time, and the fire is swept towards the sides of the oven with a large bunch of cock's feathers.

In summer the people eat *Segmiolk* (Thick Milk), prepared in the following manner: After the milk is turned, and the curd taken out, the whey is put into a vessel, where it remains till it becomes sour. Immediately after the making of cheese, fresh whey is poured lukewarm on the former sour whey. This is repeated several times, care being always taken that the fresh whey be lukewarm. Finally they let the mixture remain for some time, the longer the better, and it becomes at length so glutinous, that it may be drawn out from one side of the house to the other.

thought of by any of our schemers, whose projects only serve to teach evil-disposed bakers to make bread of any thing rather than what they ought, and to spare their pockets at the expense of the public welfare.

Even if a vessel be filled with it and set by in the cellar, as is usually practised for winter provision, care must be taken that not the least drop may run out, otherwise the whole would escape, so great is the cohesion of its particles.

This prepared milk is esteemed a great dainty by the country people. They consider it as very cooling and refreshing. Sometimes it is eaten along with fresh milk. In taking it from the dish, it cannot be poured out, as it all runs back again if not cut with a knife, or, as is more usual, parted by holding the finger against the edge of the spoon.

Intermittent fevers would not be so rare here as they are, if they could be produced by acid diet, for then this food must infallibly occasion them.

A small quantity of this preparation is sometimes put into the barley cakes, in order to give them tenacity.

I had here abundant opportunities of examining a fish, not every where to be

met with, called the Harr, (*Salmo Thymallus*, or Grayling,) which in appearance very much resembles a Salmon. (See *Fauna Suecica, ed.* 2. 125.)

The coverlets of the beds at this place are made of hare-skins.

May 22.

The cows in this neighbourhood have no horns, so that the owners can neither by the rings on the horn ascertain how many calves the cow has had, nor, as is usual with respect to goats, determine the age of the animal every year by the new horns. A few of them indeed bore horns of a finger's length only, and those bent down, immediately from their origin, so close to the hide, that they were hardly visible above the hair.

Apple trees grow between Veda and Hornoen, but none are to be seen further north. No kind of Willow is to be met with, as I was informed, throughout An-

germanland. The Hazle is not to be found here. Cherries do not always ripen, but Potatoes thrive very well. Tobacco and Hops both grow slowly, and are of rare occurrence.

In the road I saw a Cuckoo fed by a *Motacilla* (Water Wagtail?). I am sure of the fact, and that there was no deception in the case.

In the forest previous to my arrival at Ouske, I picked up a striated stone, from a small cleft in the rock, which had the appearance of imperfect cinnabar.

Ochre was here very abundant in the marshes, and had a coat which tinged the fingers with a silvery hue; a sign of iron, but not of any mineral water.

Stellaria with oblong leaves (*Callitriche autumnalis*) grew in the surrounding puddles. Those botanists are much mistaken who distinguish this from the kind with oval leaves (*Callitriche verna*), for they only differ in age. The lower leaves of the preceding year, of an ovate form, still re-

mained under water quite fresh, bearing ripe seeds in their *axillæ*.

The stones hereabouts are of a light grey colour, with large white spots.

Near the coast was a quicksand, caused here, as in Scania, by the fine light sand of the soil being taken up by the wind into the air, and then spread about upon the grass, which it destroys.

The road in several parts lies close to the sea shore.

May 23.

After having spent the night at Normaling, I took a walk to examine the neighbourhood, and met with a mineral spring, already observed by Mr. Peter Artedi*, at this his native place. It appeared to contain a great quantity of ochre, but seemed

* The celebrated writer on fishes, afterwards so intimately connected with Linnæus. The latter published his Ichthyology, and wrote his life in a style which does equal honour to his own feelings and the merit of his friend.

by the taste too astringent to be wholesome. It is situated near the coast to the west, on the south of the church, and at no great distance from it.

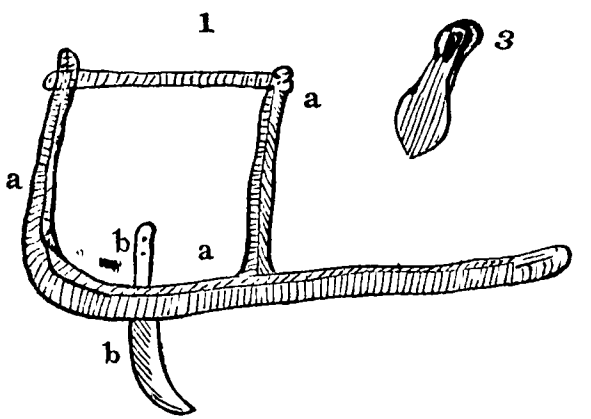
I observed on the adjacent shore that an additional quantity of sand is thrown up every year by the sea, which thus makes a rampart against its own encroachments, continually adding by little and little to the continent.

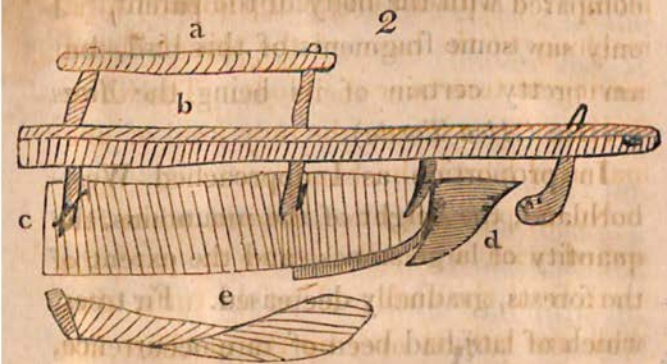
A mile, or rather more, from the land, is an island named Bonden, where the bird called Tordmule (*Alca Torda*) lays its eggs every year. These are collected every season by the peasants, who assured me that the bird never lays above one egg in a year, except that egg be taken away, and then she will repeatedly lay more. It seems to me a very curious circumstance, and scarcely possible, that the increase of the species every year should be naturally not more than one. Some persons indeed told me these birds laid two eggs. It is certain that the size of the egg is very large

compared with the body of the parent. I only saw some fragments of this bird, but am pretty certain of its being the *Anas arctica* (*Alca Torda*).

In proportion as I approached Westbothland, the height of the mountains, the quantity of large stones, and the extent of the forests, gradually decreased. Fir trees, which of late had been of rare occurrence, became more abundant. Above a mile before we come to Sörmjole, is a river called Angeræn, separating Angermanland from Westbothland.

The peasants hereabouts use the following implements, for breaking up the ground of their fallow fields.





No. 1 is a plough drawn by a horse. b, b, is a strong thick-backed knife, placed in the middle of the plough, and serving to cut straight lines through the grassy turf, which in the course of five or six years has accumulated on the soil.

No. 2 is used immediately afterwards, to cut the clods of turf from their base and turn them up. Of this a is the handle, as in No. 1, held by the ploughman's right hand; b the main beam of the plough; c the part which goes under the surface of the ground, and is terminated in the fore part by the plough-share d, which is formed obliquely, turning towards the outside, not towards the man who guides the

plough; e is placed on the top horizontally, reaching to the base of the plough-share, serving to turn over the clods. The whole is drawn by a horse, the only kind of animal used here in husbandry.

No. 3, p. 65, is a hoe, which, when furnished with a handle, serves to pare the earth from the under side of the turfs, after they are turned over by the machine last described. The first year after this operation they sow rye, but in the following season barley, when the turfs are become rotten.

WESTERBOTTEN, OR WESTBOTHLAND.

THE ground here is tolerably level; the soil sand, sometimes clay. In some places are large tracts of moss. The whole country, owing to the sand and the moss, is by no means fertile, though it affords a good deal of milk. Barley is the chief corn raised here, rye being very seldom

sown, and when any is sown, it is commonly summer rye.

Before I reached Sörmjole, two male reindeer came up to me. I was mounted on a mare, which had nearly thrown me. No flowers were here to be seen, not even the Wood Sorrel (*Oxalis Acetosella*), my only consolation in Angermanland. *Caltha palustris* alone appeared in the marshes, which in this country is the first blossom of the spring. The Cotton Rush with one spike and that with many spikes (*Eriophorum vaginatum* and *polystachion*) were now coming into bloom. *Betula nana* was abundant enough, but as yet showed no signs of catkins or leaves. Throughout the whole of this country no Ash, Maple, Lime, Elm nor Willow is to be seen, much less Hazel, Oak or Beech.

Towards evening I reached Röbäck, where I passed the night. The wind blew hard from the north-east, and the evening was cold.

May 24.

Close to Röbäck is a fine spacious meadow, which would be quite level, were it not for the hundreds of ant-hills scattered over it.

Near the road, and very near the rivulet that takes its course towards the town of Umoea, are some mineral springs, abounding with ochre, and covered with a silvery pellicle. I conceive that Röbäck may have obtained its name from this red sediment, from *röd* red, and *bäck* a rivulet. Not far from this town is another mineral spring, by drinking of which several persons have lost their lives. It flows down an adjacent hill.

Umoea, situated on the abovementioned little river, which is passed in a ferry-boat, and navigable for merchandise to the sea, is but a small town, not having yet recovered from the damage done it by the enemy, who burnt it to the ground. The ferry-boat was conducted by a brawny,

though bald and grey-bearded Charon, in an old grey coat, just such as Rudbeck describes.

I waited on Baron Grundell, Governor of the province, who is a pattern of mildness, and he received me in the kindest manner. He showed me several curiosities, and gave me much interesting information.

He had two Crossbills (*Loxia curvirostra*) in a cage, which fed on the cones of the spruce fir (*Pinus Abies*) with great dexterity. They took up a cone with their beak, and, holding it fast with one foot, picked out the seeds by means of their forked mandibles, of which the upper is very thick, ending in an oblong curved very sharp point. The lower is shorter, and cuts obliquely, sometimes to the right, sometimes to the left. Both these were male birds; their feathers of a tawny red, except the wings and forked tail, which were black.

From the window I perceived in an ad-

joining fen the Yellow-hammer (*Motacilla flava*) and some Swallows.

Baron Grundell told me he often had Snow Buntings (*Emberiza nivalis*), and Ortolans (*E. Hortulanus*), which last are frequently sold in France for the value of a ducat (nine shillings). These birds are also to be met with in Scania. Here had been plenty of Ruffs and Reeves this year (*Tringa pugnax*).

He showed me the skins of blue and black Foxes, and also of the variety called *Korssraf*, Cross Fox (*Canis Vulpes β Faun. Suec.*), which is of a yellow colour except the shoulders and hind quarters, and they are of a greyish black. He told me he had lately sent the king a live *Jarf* (*Mustela Gulo*), and that he had once had another of that species so much domesticated, that when he would have turned it into the water, at the first cutting of the ice, it would not leave him, nor would it feed on any kind of fish alive.

In the garden the Governor showed me

the garden orache, sallad, and red cabbage, which last thrives very well, though the white will not come to perfection here; also garden cresses, winter cresses (*Erysimum Barbarea β Fl. Suec.*), scurvy-grass, chamomile, spinach, onions, leeks, chives, cucumbers, columbines, carnations, sweet-williams, gooseberries, currants, the barberry, elder, guelder-rose and lilac. Potatoes here are not larger than poppy-heads. Tobacco managed with the greatest care, and when the season is remarkably favourable, sometimes perfects seed. Dwarf French beans thrive pretty well, but the climbing kinds never succeed. Broad beans come to perfection; but peas, though they form pods, never ripen. Roses, apples, pears, plums hardly grow at all, though cultivated with the greatest attention. The garden however affords good radishes, mustard and horse radish, and especially leeks, chives, winter cresses, columbines, goose-tongue (*Achillea Ptarmica*), rose-campion (*Agrostemma coronaria*), scurvy-

grass, currants, gooseberries, barberry-berries, wild rose, and lovage (*Ligusticum Levisticum*), though scarcely cherries, apples or plums.

Barley in some of the neighbouring fields was now beginning to spring up, but in others it was not yet sown.

The Governor informed me of a singular opinion prevalent here concerning the clay in the sand-hills, that it increases and decreases with the moon, so that by digging during the full moon clay may be obtained, but, on the contrary, when the moon is in the wane, sand only will be found in the same spot. The same gentleman remarked that cracks or chasms in the ground are observable in fine or dry weather, which close in cloudy or wet seasons, and may have given rise to the above idea.

Near the water side I caught an *Ephemera*, of which I made a drawing and description. It was however of a distinct genus from the proper *Ephemera*, having the wings inclining downwards, not erect,

the tail with two bristles instead of three, and the *antennæ* bent near the extremity. (This appears to have been a small specimen of the *Phryganea bicaudata*.)

From my first arrival in Westbothland, I had remarked that all the inhabitants used a peculiar kind of shoes or half-boots, called *Kängor*. These seemed at first sight very awkward, but I soon found they had many advantages over common shoes, being easier in wearing, and impenetrable to water. Those who wear them may walk in water up to the tops without wetting their feet; for the seams never give way as in our common shoes. Another advantage is that they require no buckles, and serve equally well for shoes or boots, so that those who follow the plough are not obliged to buy boots for that purpose. The lowest price of a pair of common boots is nine dollars, and of strong shoes five; but these cost only two dollars. They are cut so that not a morsel of leather is wasted. Thick soles, formed as usual of three or four

layers of leather, are here needless, neither are heels wanted. Nature, whom no artist has yet been able to excel, has not given heels to mankind, and for this reason we see the people of Westbothland trip along as easily and nimbly in these shoes as if they went barefoot.

In the cornfields lay hundreds of Gulls (*Larus canus*) of a sky-blue colour.

May 26.

I took leave of Umoea. The weather was rainy, and continued so during the whole day. I turned out of the main road to the left, my design being to visit Lyckselc Lapmark. By this means I missed the advantage I had hitherto had at the regular post-houses, of commanding a horse whenever I pleased; which is no small convenience to a stranger travelling in Sweden. It now became necessary for me to entreat in the most submissive manner when I stood in need of this useful animal. The road

grew more and more narrow and bad, so that my horse went stumbling along, at almost every step, among stones, at the hazard of my life. My path was so narrow and intricate, along so many by-ways, that nothing human could have followed my track. In this dreary wilderness I began to feel very solitary, and to long earnestly for a companion. The mere exercise of a trotting horse in a good road, to set the heart and spirits at liberty, would have been preferable to the slow and tedious mode of travelling which I was doomed to experience. The few inhabitants I met with had a foreign accent, and always concluded their sentences with an adjective. Throughout this whole day's journey nothing occurred to my observation worth notice, except a fine kind of sand by the rivulet at Gubbele near Brattby, which would be excellent for the purpose of making moulds for casting metal.

Not far from Spoland I caught on a willow a small insect of the beetle tribe, of a

red colour, with black branching lines surrounding the whole body, and a golden head.

(This appears by the drawing, here copied from the original manuscript, to be *Chrysomela lapponica.*) Here grew a *Salix* with ovate-oblong leaves, very hairy all over (*S. lanata*); its catkins were, for the most part, far advanced and faded.

In the evening I arrived at Jamtboht, where some women were sitting employed in cutting the bark of the aspen-tree (*Populus tremula*) into small pieces, scarcely an inch long, and not half so broad. The bark is stripped from the tree just when the leaves begin to sprout forth, and laid up in a place under the roof of a house till autumn or the following spring, when it is cut into the small fragments above described. In this state it serves as food for cows, goats and sheep, instead of hay, the latter being a very scarce article in these

parts; for the fields consist principally of marshy tracts, whose herbage is but of a coarse kind.

On my inquiring what I could have for supper, they set before me the breast of a Cock of the wood (*Tetrao Urogallus*), which had been shot and dressed some time the preceding year. Its aspect was not very inviting, and I imagined the flavour would not be much better; but in this respect I was mistaken. The taste proved delicious, and I wondered at the ignorance of those who, having more fowls than they know how to dispose of, suffer many of them to be spoiled, as often happens at Stockholm. I found with pleasure that these poor Laplanders know better than some of their more opulent neighbours, how to employ the good things which God has bestowed upon them. After the breast is plucked, separated from the other parts of the bird, and cleaned, a gash is cut longitudinally on each side of the breast-bone, quite through to the bottom, and two others

parallel to it, a little further off, so that the inside of the flesh is laid open in order that it may be thoroughly dressed. The whole is first salted with fine salt for several days. Afterwards a small quantity of flour is strewed on the under side to prevent its sticking, and then it is put into an oven to be gradually dried. When done, it is hung up in the roof of the house to be kept till wanted, where it would continue perfectly good, even for three years, if it were necessary to preserve it so long.

It rained so violently that I could not continue my journey that evening, and was therefore obliged to pass the night at this place. The pillows of my bed were stuffed with the hair of the reindeer instead of feathers. Under the sheet was the hide of a reindeer with the hair on, the hairy side uppermost, on which the people told me I should lie very soft.

May 27.

In the morning the continued rain prevented my pursuing my journey till noon. The bark of the large smooth kinds of Willow is here used for tanning leather. The smooth bark of the upper branches, cut into small pieces, is chosen for the purpose, the coarse part on the bottom of the stem being useless.

At noon I departed from the place where I had slept, and continued to pursue the same bad road as the preceding day, which was indeed the worst I ever saw, consisting of stones piled on stones, among large entangled roots of trees. In the interstices were deep holes filled with water by the heavy rains. The frost, which had but just left the ground, contributed to make matters worse. All the elements were against me. The branches of the trees hung down before my eyes, loaded with rain-drops, in every direction. Wherever any young birch trees appeared, they were bent down

to the earth, so that they could not be passed without the greatest difficulty. The aged pines, which for so many seasons had raised their proud tops above the rest of the forest, overthrown by the wrath of Juno, lay prostrate in my way. The rivulets which traversed the country in various directions were very deep, and the bridges over them so decayed and ruinous, that it was at the peril of one's neck to pass them on a stumbling horse. It seemed beyond the power of man to make the road tolerable, unless a Bjelke (Governor of Gefle) had the command of the district.

Many persons had confidently assured me, that it was absolutely impossible to travel to Lycksele in the summer season; but I had always comforted myself with the saying of Solomon, that "nothing is impossible under the sun:" however, I found that if patience be requisite any where, it is at this place. To complete my distresses, I had got a horse whose saddle was not stuffed, and instead of a

bridle I had only a rope, which was tied to the animal's under jaw. In this trim I proceeded on my journey.

Here and there, in the heart of the forest, were level heathy spots, as even as if they had been made so by a line, consisting of barren sand (*Arena Glarea*), on which grew a few straggling firs, and some scattered plants of ling. Some places afforded the perforated coralline Lichen (*L. uncialis*), which the inhabitants, in rainy weather when it is tough, rake together into large heaps, and carry home for the winter provender of their cattle. These sandy spots were in extent three quarters of a mile or a mile, encompassed as it were with a rampart, or very steep bank, fifteen or twenty ells in height, so nearly perpendicular that it was not to be ascended or descended without extreme difficulty. They might be compared to the mountain which Alexander the Great ascended with so much labour. It often happened that above one of these sandy heaths lay another equally

barren. They resembled the ridges of a field, except the perfect flatness and grea breadth of the surface of each, and their being destitute of stones. The interstices of the country between these embanked heaths were occupied by water, rocks and marshes, producing abundance of firs intermixed with some birches, all covered with black and white filamentous Lichens. Juniper bushes but rarely occurred, and were all of a very diminutive size, and close-pressed to the ground.

At Skullbacken is a small current of water, which rises out of the ground at that very spot. I tried to feel the bottom with my stick, but could not reach it.

At Abackan, and on the road beyond it for a considerable way, some loose ice still remained, which surprised me much at this season of the year; yet I recollected that but a week before I had met with snow in the neighbourhood of mount Skula.

Here and there on the road lay a crusta-

ceous *Byssus*, consisting as it were of a white rough brittle membrane, with white grains scattered over it*.

On the sandy heaths among the perforated Lichen (*uncialis*) grew another kind much resembling it, but as thick as the finger, snow-white, and with more copious and dense entangled branches, which, not having been hitherto described, I denominated *Coralloides ramosissimum perforatum, ramis implexis, niveum* †. There was also an elegant cup-moss, (*L. cocciferus*,) repeatedly proliferous from the centre of its cups, two or more cups originating together from one centre, all over of a grey hue, except the scarlet tubercles which bordered the uppermost cups. Every where in the road grew the beforemen-

* From the above description, this is very likely to have been the *Lichen byssoides, Engl. Bot. v.* 6. *t.* 373, in its early state, when it has exactly the appearance Linnæus mentions.

† By the description and sketch in the manuscript, this seems a variety of *L. rangiferinus*.

tioned leafy sulphur-coloured Lichen (*nivalis?*) in the greatest profusion.

The marshy places abounded with *Muscus tectorius** and *Polytrichum*, intermixed with abundance of Black Whortle-berries.

Wherever I came I could get nothing to drink but water.

Against the walls of the houses the Agaric shaped like a horse's hoof (*Boletus igniarius*) was hung up to serve as a pincushion.

As a protection against rain, the people wear a broad horizontal collar made of birch bark, fastened round the neck with pins.

The women wash their houses with a kind of brush, made of twigs of spruce fir, which they tie to the right foot, and go backwards and forwards over the floor†.

* I am ignorant what Linnæus means by this denomination.

† This closely resembles the French method of cleaning, or at least scrubbing, their rooms, except that the Laplanders have the advantage in using water as well as a brush.

I observed they had gathered some of the Water Trefoil (*Menyanthes trifoliata*), which is the plant here called Missne. It is ground and mixed with their corn to make bread. They also boil it with some kinds of berries into an electuary, but it is in every state very bitter. The root only is used.

Part of this day's journey was performed in a Lapland boat, which will be described hereafter.

The peasants of this country, instead of tobacco, smoke the buds of hops, or sometimes juniper berries, and when nothing else can be had, the bark of the juniper tree; but to supply the want of snuff they use ashes mixed with a small portion of real snuff. They strain their milk through platted tufts of hair from a cow's tail.

In the evening I reached Teksnas, situated in the parish of Umoea. Seven miles distant from this place is the church, the road to which is execrable, insomuch that the people are obliged to set out on Friday

morning to get to church on Sunday. On this account they can very seldom attend divine service, except on fast days, Whitsunday, Easter sunday, and Christmas day.

How trifling would be the expense of building a small church, and how much have those in authority to answer for before God for neglecting to provide one! Timber for the purpose was brought here so long ago as the time of the late Abraham Lindelius; but it has lain till it is rotten, as the clergy find some difficulty in the undertaking: nor is this the only obstacle!

Here I observed a kind of dark-coloured gnat with very large dark wings (*Empis borealis*).

May 28.

I left Teksnas and proceeded to Genom; but as there is no conveyance but by water, from the last-mentioned place to Lycksele, and the wind blew very hard, I was obliged to stop at Genom till the following day.

Indeed I did not arrive there till nine o'clock, when I found the people assembled at prayers, after which a sermon was read out of a book containing several; and as this service did not end till eleven, it would then have been too late to have set out for Lycksele, more than five miles distant, without any house or resting-place between.

One of the peasants here had shot a small Beaver. I inquired concerning the food of this animal, and was told it was the bark of trees, the birch, fir, and mountain ash, but more especially the aspen, and the castor becomes larger in proportion as the beaver can get more of the aspen bark. This confirmed the truth of what Assessor Rothman formerly asserted, that castor is secreted from the intermediate bark of the poplar, which has the same scent, though not quite so strong: hence it is to be presumed that a decoction of this bark, if the dose were sufficiently large, would have the same medicinal effects.

I wonder no naturalist has classed this animal with the Mouse tribe, (*Mures.* Linnæus afterwards called the Order *Glires,*) as its broad depressed form at first sight suggested to me that it was of that family; in which opinion I was confirmed when I examined the broad naked tail, the short obtuse ears, and the two pair of parallel front teeth, so well formed for cutting, of which the lower pair are the largest.

The people here eat the flesh of the beaver as well as of the hare and squirrel, which indeed are all of the same natural family. The Romans, we are told, ate mice by way of a choice dainty. The beaver is very seldom roasted, but generally boiled. The rump is thrown away, but the feet are eaten. The skin spread out and dried is worth twelve dollars. The castor fetches half a dollar, or sometimes a dollar. I found the boiled flesh very insipid, for want of salt.

This young Beaver, which fell under my examination, was a foot and half long, ex-

clusive of the tail, which was a palm in length and two inches and a half in breadth. The hairs on the back were longer than the rest; the external ones brownish black, the inner pale brown. The belly clothed with short dark-brown fur. Body depressed. Ears obtuse, clothed with fine short hairs, and destitute of any accessory lobe. Snout blunt, with round nostrils. Upper lip cloven as far as the nostrils; lower very short. The whiskers black, long and stout. Eye-brow of three bristles like the whiskers over each eye. Neck none. The fur of the belly was distinguished from that of the sides by a line on each side, in which the skin was visible. Feet clothed with very short hairs, quite different from those of the body. A fleshy integument invested the whole body. The *intestinum cæcum* was large, with a very large appendix. Upon the stomach lay two large cellular glands, of whose nature and use I am ignorant. There were two cutting teeth in each jaw, of which the upper pair were the

shortest, and notched at the summit like steps; the lower and larger pair were sloped off obliquely. Grinders very far remote from the fore-teeth, which is characteristic of the animal, four on each side. Hind feet webbed, but fore feet with separate claws. Tail flat, oblong, obtuse, with a reticulated naked surface.

The strength of the Beaver in its fore teeth, so as to cut through the trunk of the largest aspen trees, is I believe beyond that of any other animal.

May 29.

Very early in the morning I quitted Genom in a hacep or small boat, such as shall be hereafter described, proceeding along the western branch of the river of Umoea; for the river which takes its name from that place divides into two branches near Gresele, two miles from Umoea. One branch comes from Lycksele, the other, as I was told, from Sorsele. By the western branch, as I have just mentioned, we pro-

ceeded to Lycksele. When the sun rose, nothing could be more pleasant than the view of this clear unruffled stream, neither contaminated by floods, nor disturbed by the breath of Æolus. All along its translucent margin the forests which clothed its banks were reflected like another landscape in the water. On both sides were several large level heaths, guarded by steep ramparts towards the river, and these were embellished with plants and bushes, the whole reversed in the water appearing to great advantage. The huge pines, which had hitherto braved Neptune's power, smiled with a fictitious shadow in the stream. Neptune however, in alliance with his brother Æolus, had already triumphed over many of their companions, the former by attacking their roots, while the latter had demolished their branches.

We passed several small islets separated from the main land by the action of the current, as *Calnäsholm* (the isle of Calnäs), &c. Close to the shore were many *Cha-*

radrii Hiaticulæ (Ringed Plovers) and *Tringæ* (Sandpipers). One of the latter my companions shot, but destroyed it so completely that we obtained only a wing and a leg entire, the remaining parts being so torn that I could not make out the species. The foot consisted of four toes, of which the hinder one was very small, and the two external ones joined by a web at their base.

A little further on a couple of young owls were suspended on a tree. On my inquiring what these birds had done to be so served, the rower made me remark, on the most lofty of the fir trees, concave cylinders of wood, closed at top and bottom, and having an aperture on one side. These cylinders are placed on the highest part of the trees, in order to tempt Wild ducks to lay their eggs in them, and they are afterwards plundered by the country people. In one of these nests a brood of young owls had been hatched instead of young ducks.

Presently afterwards the breast of a Cock

of the wood was given me to eat, by way of a bâit. It had been shot this spring and dried in the sun, without being previously cooked; neither had it so many longitudinal cuts as that I have described in the foregoing pages.

As we proceeded further we saw seven or eight large white swans lying on the water, making a loud noise, and biting one another with their beaks. Cranes also are found here. The rower said he had shot one and nailed it up against the wall, with all its flesh and feathers on. What an absurdity!

The peasant who was my rower and companion had placed nets all along the shore, in which he caught plenty of pike. He had upwards of thirty small nets. The money with which he pays his taxes is chiefly acquired by fishing. A dried pike of twenty pounds weight is sold for a dollar and five marks, silver coin.

In one of the nets he found a large male Goosander caught (*Mergus Merganser*).

The bill of this bird was long and nar-

row, of a blood red, blackish on the upper edge. Its upper mandible longest, tipped with a hooked point which rendered it obtuse, and furnished with thirty large teeth pointing inwards. Lower mandible channelled underneath, and furnished with about forty smaller teeth, likewise pointing inwards. A triple row of very small teeth was observable in the upper mandible within the others. Tongue narrow, bordered with bristles and with a double row of very minute teeth. Nostrils oblong, placed in the substance of the bill. Eyes round, with a crimson iris. A pellucid membrane, proceeding from the inner corner of the eye, covers the ball while the bird is diving under water; which is remarkable. It has besides a whitish membrane of greater thickness (*membrana nictitans*), which closes the eye as in other birds. The head is of a grey colour, with a very long pendulous blackish crest composed of a few light downy feathers. Neck like that of a Woodcock. Breast and belly white. Middle of the back black, with white lateral spots, further on grey

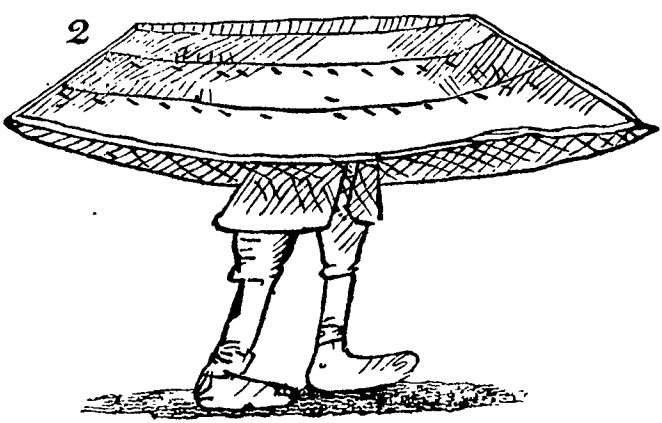
or whitish, with transverse undulated lines. The ten outermost large feathers of the wing are black; the inner ones black and white, so that the *speculum*, or spot of the wing, is very large and white, divided by two black transverse lines. Tail short, ash-coloured. Feet red. Legs compressed. Hind toe very small, with a membranous lobe, and curved inwards. Fore toes three, the outermost of four joints, middle one of three, and the innermost of two only. All the toes are connected by a palmate web, and the innermost has, besides, a marginal longitudinal membrane. The windpipe is remarkable, formed not of half rings, as in most birds, but of circular ones. About the middle it is dilated into a sort of bag, and further down into another smaller one*.

LYCKSELE LAPLAND.

THE river along which we had rowed for the space of almost three miles, and which had hitherto been easily navigable, now

* On this subject see Dr. Latham's excellent paper in the fourth vol. of the Linn. Society's Transactions, p. 90.

threatened us occasionally with interruption, from small shelves forming cascades, and at length we came to three of these, very near each other, which were absolutely impassable. One of them is called the waterfall of Tuken. My companion, after committing all my property to my own care, laid his knapsack on his back, and turning the boat bottom upwards, placed the two oars longitudinally, so as to cross the seats. These rested on his arms as he carried the boat over his head, and thus he scampered away over hills and valleys, so that the devil himself could not have come up with him.



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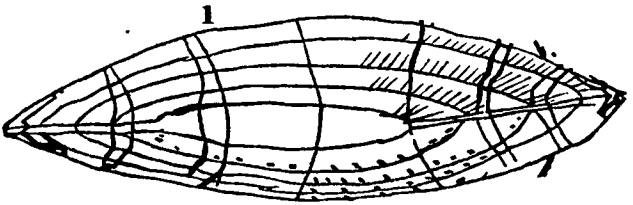
See a sketch of this boat annexed.



Its length was twelve feet, breadth five, and depth two. The thickness of the edge not more than two lines. The four planks which formed each of its sides were of root of spruce fir, each about a span broad and four lines thick. The two transverse boards or seats were of the branches of the same tree. The seams were secured obliquely with cord as thick as a goosequill.

Ice was still to be seen here and there near the shore of the river, though not in any great quantity.

The trees of this neighbourhood are principally Common Fir (*Pinus sylvestris*), with a smaller proportion of Spruce (*P. Abies*), and Birch. Now and then some Poplars are to be seen. The shrubs are

dwarf kinds of Willow and Dwarf Birch (*Betula nana*); both now in blossom.

The more humble and herbaceous plants are Ling, (*Erica vulgaris* and *Tetralix**), four kinds of *Vaccinium*, *Linnæa*†, *Pyrola pyrifolia* (*P. secunda*), *Epilobium*, Golden rod (*Solidago Virga aurea*), *Empetrum* in flower, Dandelion, *Convallaria bifolia*, Sweet grass (*Holcus odoratus*) in flower, Small smooth Rush (*Juncus filiformis*), Jointed water Rush (*J. articulatus*), Water Horse-tail (*Hippuris vulgaris*), Marsh Marigold (*Caltha palustris*), a *Mnium* not in fructification, four species of *Lycopodium*, *Andromeda polifolia*‡, Milfoil (*Achillea Millefolium*), and Small Sorrel (*Rumex Acetosella*).

The birds I remarked were the Ringed

* The manuscript mentions both *Erica* and *Tetralix*, yet the latter is not in the *Flora Lapponica*, nor is it common in Sweden.

† This name occurs here for the first time in the manuscript.

‡ The original is *Daphne* as above; see p. 23.

Plover (*Charadrius Hiaticula*), the Redwing (*Turdus iliacus*), the Lumme (*Colymbus arcticus*), the Tufted Duck (*Anas Fuligula*).

Also a few insects, as *Dytiscus natator*, &c.

The forest was rendered pleasant by the tender leaves of the Birch, more advanced than any I had hitherto met with, owing to the rain which had fallen the Saturday preceding, and the sunshine of this and the foregoing day.

The banks of the river are composed of sand or small pebbles; on the latter the water had deposited a blackish stain. A little before we reached the church of Lycksele, the fourth waterfall presented itself. This is more considerable than any of the three preceding, falling over a rock. On its brink the curate had erected a mill, which in this mountainous spot wanted no artificial dam, as Nature had prepared one in the most complete manner.

The adjoining mountain consists of a

mixed spar, and extends a good way to the right, being in one part very lofty, and perpendicular, like a vast wall, towards the shore. Some islands, rather considerable in size, are seen in the river as we approach this waterfall.

At eight o'clock in the evening I arrived at the hospitable dwelling of Mr. Oladron, the curate of Lycksele, who, as well as his wife, received me with great kindness. They at first advised me to stay with them till the next fast day, the Laplanders not being implicitly to be trusted, and presenting their fire-arms at any stranger who comes upon them unawares, or without some recommendation.

May 30.

In the morning however my hosts changed their opinion, being apprehensive of my journey being impeded by floods if I delayed it.

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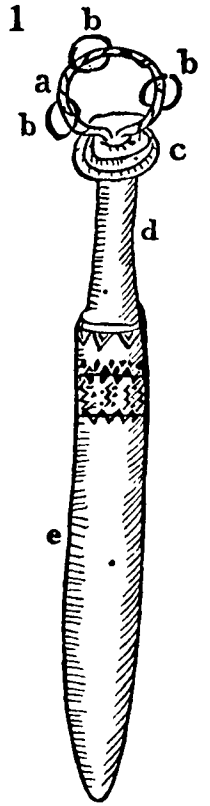
I here learned the manner in which the Laplanders prepare a kind of cheese or curd, from the milk of the reindeer and the leaves of Sorrel (*Rumex Acetosa*). They gather a large quantity of these leaves, which they boil in a copper vessel, adding one third part water, stirring it continually with a ladle that it may not burn, and adding fresh leaves from time to time, till the whole acquires the consistence of a syrup. This takes place in six or seven hours, after which it is set by to cool, and is then mixed with the milk, and preserved for use from autumn till the ensuing summer, in wooden vessels, or in the first stomach of the reindeer. It is kept either in the caves of the mountains, or in holes dug in the ground, lest it should be attacked by the mountain mice (*Mus Lemmus*).

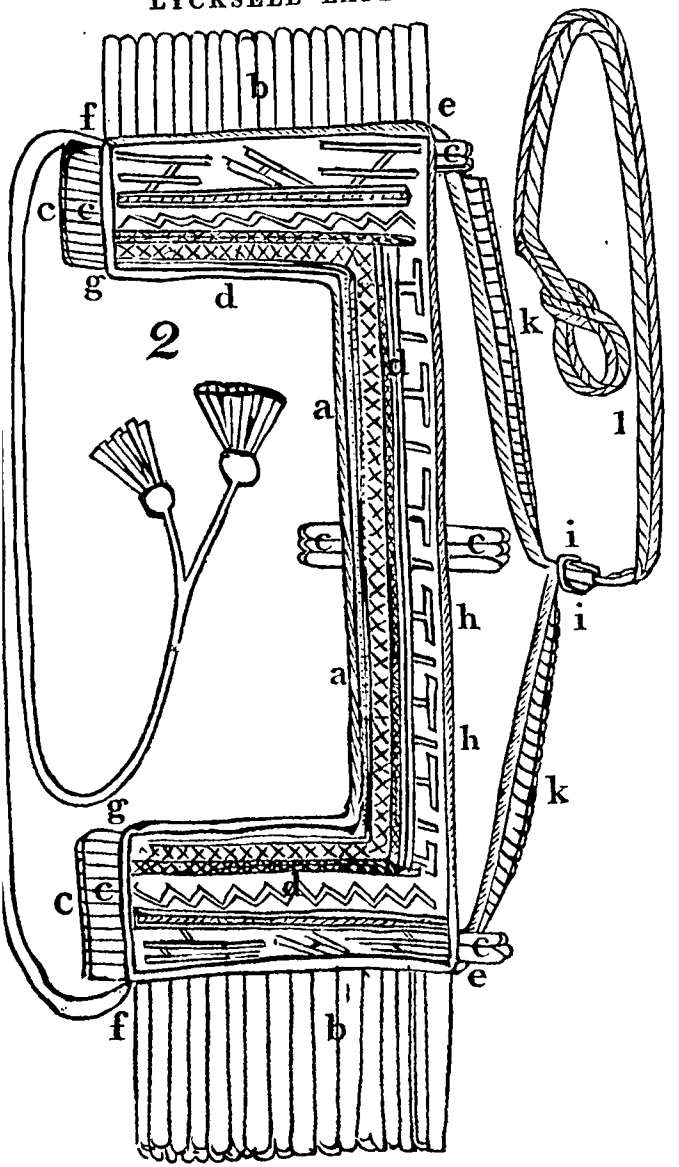
Near the shore at Lycksele I observed vast shoals of those small fishes called the Glirr (*Cyprinus Aphya*), each about an inch and half long, and two lines broad.

In this place I made a description and sketches of the whole caparison of a reindeer, with the stick used by the Laplanders in driving that useful animal.



The latter, which serves as a walking stick, is round, two feet and half long, and three inches thick, made of wood, see fig. 1. a, is a twisted iron ring, encompassed with several smaller rings of the same metal, b b b, which serve to make a rattling noise to urge the reindeer occasionally to quicken his pace. c, is the head, turned out of a reindeer's horn. d, the handle of turned wood. e, the stick itself, which is likewise turned, of one piece with the handle, and tapering towards the end.

Fig. 2 is the bridle, made of green or blue cloth, bordered with leather, a a, embroidered with tin foil, and fringed at the sides with small strips of list, b b, about six inches long and one broad, of all sorts of colours. Those at c c are only two or three inches long. The cloth is lined on the inside with reindeer skin, stripped of its hair, and dyed red with alder bark, and is in length, from e to e, nine or ten inches, and from e to f about half as much.

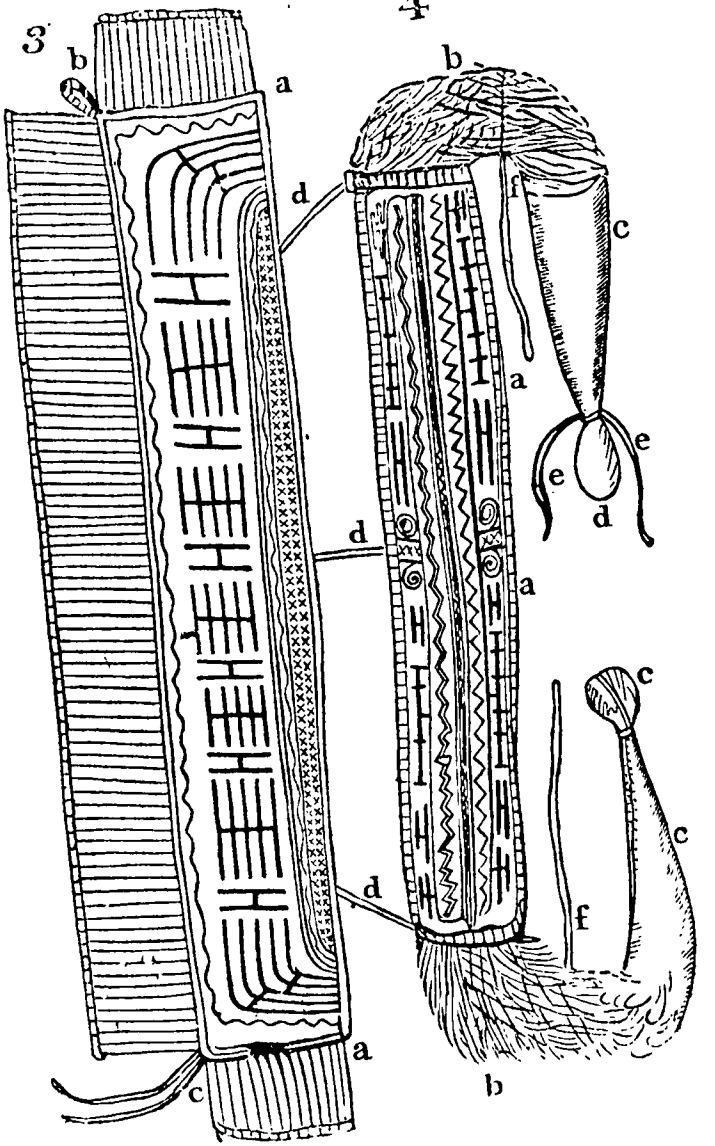

b
f
e
c
c
g
d
2
d
a
k
1
i
i
h
a
h
k
g
c
c
e
e
f
b

Its breadth, from f to g, is three inches, but from a a to h h, only an inch and half.

At each end, f f, is a rope two feet long and as thick as a child's finger, covered with the beforementioned kind of red leather, and terminated by a tuft of various-coloured list. At the opposite angles, e e, are two similar cords, bordered on one side for about eight inches each, that is as far as i, with little strips of coloured list. To the part i is fixed a rope of leather like a whip cord, l, twelve feet long, with a noose at each end, one of which goes round the part already described at i.

a a a, h h h, is placed at the forehead of the animal. The ropes, f f, are tied round the horns, so that the tassels of list hang down on each side. e e goes under its neck like a halter, and l is the rein, which is fastened by the noose at its further end round the arm of the driver.

Fig. 3 represents the saddle-cloth, which is about two feet and half long, besides its ornaments, and six or seven inches broad,

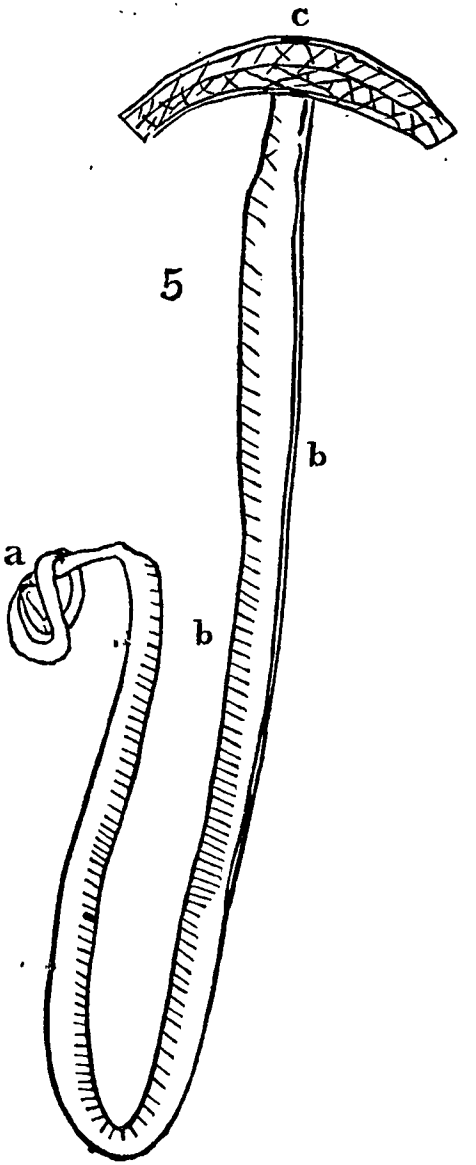

3
b
a
d
d
d
a
c
4
b
f
c
a
e
e
d
a
c
c
f
b

Its ends, a b and a c, are joined under the reindeer's belly. The straps, d d d, are a foot long.

Fig. 4 is the harness, a foot and half long, and three inches broad, without its decorations. Under this is laid a roll, b, made of reindeer skin, with the hair on, as thick as a man's arm, which contains a twisted net. This is covered in its upper part by a, but the ends, c c, are exposed to view, and covered with blue cloth embroidered with tin foil, each of them terminating in a sort of ball, tied up with a thong, e e, as the hairy part is with another thong.

Fig. 5 has at one end a noose, a, which embraces the two balls just described, from which a double leather thong, three inches broad and four feet long, extends to a transverse piece of bone, c, serving to take hold of the sledge in which the Laplander travels.

No. 3 therefore is placed on the back of the reindeer, b and c being tied toge-


c
5
b
a
b

ther below the shoulders. No. 4 is fixed upon the neck, and fastened with f f over the chest, forming the saddle, the hairy part serving to keep it from galling the animal. The ends, c c, pass between the hind legs, and to them is fixed, as before mentioned, the leather which draws the sledge.

I understood that the water, along part of which I had pursued my route, was divided into broad navigable spaces, interrupted frequently by narrow or precipitous passes, called by the name of a *forss*, force, of which a long enumeration was given me.

The pasture ground near the parsonage of Lycksele was very poor, but quite the reverse about a quarter of a mile distant. Here the butter was extremely remarkable for its fine yellow colour, approaching almost to a reddish or saffron hue. On my inquiring what kind of herbs most abounded in these pastures, the people gave me a description of one which I judged to be a *Melampyrum*, and on my drawing a sketch

of that kind of plant, they assured me it was what they meant, which is very plentiful in their forests, and is called Kowall*.

In the school here were only eight scholars.

I procured at Lycksele a Laplander's snuff-box, which is of a round figure, turned out of the horn of a reindeer.

The church of Lycksele, built of timber, was in a very miserable state, so that whenever it rained the congregation were as wet as if they had been in the open air. It had altogether the appearance of a barn. The seats were so narrow that those who sat on them were drawn neck and heels together.

Here was a woman supposed to labour under the misfortune of a brood of frogs in her stomach, owing to her having, in the course of the preceding spring, drunk water which contained the spawn of these ani-

* Linnæus has mentioned this circumstance in his *Flora Lapponica, n.* 240, where he confounds *Melampyrum pratense* and *sylvaticum* together as one species.

mals. She thought she could feel three of them, and that herself, as well as persons who sat near her, could hear them croak. Her uneasiness was in some degree alleviated by drinking brandy. Salt had no effect in destroying the frogs. Another person, who for some years had had the same complaint, took doses of *Nux Vomica*, and was cured; but even this powerful remedy had been tried on this woman in vain. I advised her to try tar, but that she had already taken without success, having been obliged to throw it up again*.

* Linnæus writes as if he did not absolutely disbelieve the existence of these frogs, which were as much out of their place as Jonah in the whale's belly. The patient probably laboured under a debility of the stomach and bowels, not uncommon in a more luxurious state of society, which is attended with frequent internal noise from wind, especially when the mind is occasionally agitated. Yet the idea of frogs or toads in the stomach has often been credited. Not many years ago a story appeared in the Norwich paper, of a gentleman's servant having eaten toad-spawn with water cresses, which being hatched, occasioned dread-

May 31.

Divine service being over, I left Lycksele in order to proceed towards Sorsele.

The riches of the Laplanders consist in the number of their reindeer, and in the extent of the ground in which they feed. The poorest people have from fifty to two hundred of these animals; the middle class from three hundred to seven hundred, and the rich possess about a thousand. The lands are from three to five miles in extent. Wild reindeer are seldom met with in Lapmark. They chiefly occur on the common between Granoen and Lycksele. It very often happens that those whose herds are large lose some of their reindeer, which they generally find again in the ensuing season, and they then drive them back to their old companions. If they will not

ful uneasiness, till he brought up a large toad by means of an emetic; and this story was said to have been sworn before the mayor of Lynn, as if it had been really true.

follow the herd, they are immediately killed.

Several parts of Lapmark are inhabited by colonists from Finland, who, by royal license, taking up their abode here, break up the soil into corn and pasture lands*. They pay a certain tribute to the crown, and are thenceforth free of all extraordinary taxes, as well as the native Laplanders, being neither obliged to furnish a soldier for the army, nor a sailor for the navy. Whether it be time of peace or war it is all the same to them, as they are burthened with no taxes. These Finlanders are permitted to fix in any part of Lapland in which they find a probability of cultivating the ground to advantage, so that there is no doubt but most part of Lapmark will in time become colonized and filled with villages.

At Easter, Whitsuntide and Christmas, as well as on the four annual festivals by

* These colonists (*novaccolæ*) are often mentioned in the *Flora Lapponica*.

law established, the Laplanders and colonists usually attend divine service at church, where they stay till the holidays are over, and are accommodated in huts adjoining to the sacred edifice. Besides the times above mentioned, the colonists go to church on Lady-day, Midsummer, Michaelmas, and the 21st of September or St. Matthew's day. Those who live at no great distance from a church, attend there every other Sunday, to hear a sermon. On the intermediate Sundays, prayers are read to the members of each family at home.

At Whitsuntide this year no Laplander was at church, the pikes happening to spawn just at that time. This fishery constitutes the chief trade of these people, and they were therefore now, for the most part, dispersed among the alps, each in his own tract, in pursuit of this object.

I observed the forests to consist chiefly of Fir and Birch. Where woods of the former had been burnt down, the latter

sprung up in abundance, and wherever the Birch abounded, the pasture ground was of the best quality.

At Flaskesele I found *Rubus alpinus repens* (*R. saxatilis*), *Trientalis*, *Aconitum lycoctonum*, *Ulmaria* (*Spiræa*), *Podagraria tenuifolia sterilis* (probably *Angelica sylvestris*), *Polypodium Dryopteris*, *Thymelæa* of the old writers (*Daphne Mezereum*), Herb Christopher (*Actæa spicata*), and Juniper (*Juniperus communis*); also *Lichenoides* with a greyish white crust and flesh-coloured tubercles, growing in watery places (*Lichen ericetorum*), and another on stones with black tubercles. A yellow species with a leafy crust grew on the Juniper (*L. juniperinus*).

I remarked here water abounding with a red ochraceous sediment like arnotto (*Bixa Orellana*), such as I had before seen further south. It was chiefly in the bogs near Flaskesele water-fall that this ochre was to be found, and it stained the footsteps of

passengers who passed over it. The colonists use it to paint their window-frames red.

The eatable moss of Norway (*Lichen islandicus*) was here of two kinds, the one broad and scattered, the other in thick tufts about three inches high. Both of them are reddish towards the root, and are certainly only varieties of each other.

Near the water side I met with the nest of a Sandpiper (*Tringa Hypoleucos*), which is one of the smallest of its genus. The nest was made of straw, and contained four eggs. The parent bird had flown away at my approach.

In the neighbouring forest grew a rare little leafy *Lichenoides*, of a fine saffron colour beneath, and bearing on the upper side flat oblong shields (*Lichen croceus*). Also the *Boletus perennis* (described in *Fl. Lapp.*), and a small white Agaric with gills alternately forked and undivided.

Adjoining to the cataract of Gransele the strata in the left-hand bank appeared

as follows. Under the soil a brown sand, next to it some fathoms depth of white, below which were two fathoms of a purple sand, which lay upon small stones, and those upon larger ones on a level with the water.

The Little Eared Grebe (*Colymbus auritus*) was here occasionally quite black, or black with white spots under the wings. There was great abundance of Wild Ducks, those birds abounding as much on this side of Lycksele as on the other.

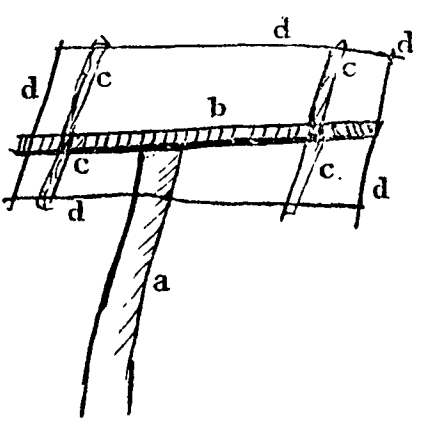
This part of the country is beautifully diversified with hills and valleys, clothed with forests of birch intermixed with fir, which were now reflected by the calm surface of the water.

In the *force* or water-fall of Gransele are thirteen small islands.

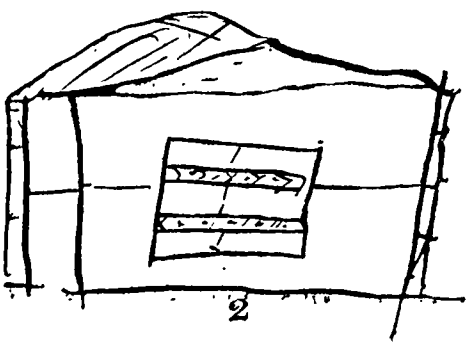
I noticed on both sides of the river several summer huts of the Laplanders, in which they reside, for a short time together, during that season. A Laplander never remains more than a week on one

spot, not only because of seeking fresh pasture for his reindeer, but because he cannot bear to stay long in a place. He drives the whole herd together, young and old, into the river, to swim over to the opposite shore, which these animals easily perform, though the stream is more than eight gunshots wide.

At one place, close to the river, was á Laplander's shop, raised on a round pole, fig. a, as high as a tall man and as thick as one's arm. This pole supported a long horizontal beam, b, with two cross pieces, c c, which together formed the foundation



of the edifice, and on this rested the wooden walls, whose form, together with the roof and door, may be more clearly seen at fig. 2. The height of the apartment was



two feet; its length and breadth a fathom each. This structure is never moved from its place. The walls are very thin; the ceiling is of birch bark, with a roof of wood and stone above it. It is scarcely possible to conceive how the owner can creep into this building, the door being so small.

In a small bay of the river a large stone stood two or three ells in height above the water, which supported a fir tree six ells high, and, as appeared from counting its

annual shoots, twelve years old. It seemed to have no particle of earth to nourish it; but perceiving some cracks in the rock, I was persuaded that its roots must through them find access to the water.

Towards evening I heard the note of the Red-wing (*Turdus iliacus*). On the north side of the forest large pieces of ice still remained unmelted near the shore.

The bark of the birch is extremely useful to the inhabitants of Lapland. Of it they make their plates or trenchers, boat-scoops, shoes, tubs to salt fish in, and baskets.

Near the shore grew the Naked Horse-tail (*Equisetum hyemale*), having a shoot springing from its root on each side. The sheathing cups of its stem are white, with both their upper and lower margins black. A more remarkable circumstance is, that the whole plant is perennial, not merely the root.

In the neighbouring marsh or moss the greater part of the herbage consisted

of *Juncellus aquaticus**, which now bore its diminutive blossoms. I found three stamens to each scale, with a style among the upper ones, which was divided half way down into three lobes. Some of the spikes consisted only of stamens. The root is particularly curious, being scaly, with an entangled tuft of fibres under each scale, which form the basis of the turf.

The Laplanders are very fond of brandy, which is remarkable in all people addicted to fishing; and there is nothing that the Laplanders pursue with such ardour as hunting and fishing.

June 1.

We pursued our journey by water with considerable labour and difficulty all night long, if it might be called night, which was as light as the day, the sun disappearing for about half an hour only, and the temperature of the air being rather cold. The

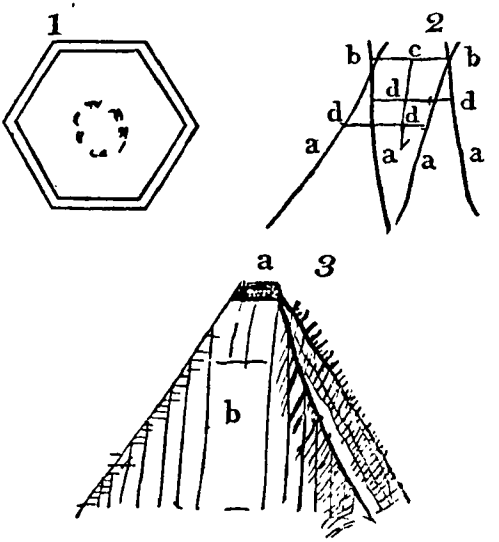
* It must surely be the *Scirpus cæspitosus* of which Linnæus here speaks.

colonist who was my companion was obliged sometimes to wade along in the river, dragging the boat after him, for half a mile together. His feet and legs were protected by shoes made of birch bark. In the morning we went on shore, in order to inquire for a native Laplander, who would undertake to be my guide further on. Finding only an empty hut at the spot where we landed, we proceeded as fast as we could to the next hut, a quarter of a mile distant, which likewise proved unoccupied. At length we arrived at a third hut, half a mile further, but met with as little success as at the two former, it being quite empty. Upon which I dispatched my fellow-traveller to a fourth hut, at some distance, to see if he could find any person fit for my purpose, and I betook myself to the contemplation of the wild scenes of Nature around me.

The soil here was extremely sterile, consisting of barren sand (*Arena Glarea*) without any large stones or rocks, which

are only seen near the shores of the waters. Fir trees were rather thinly scattered, but they were extremely lofty, towering up to the clouds. Here were spacious tracts producing the finest timber I ever beheld. The ground was clothed with Ling, Red Whortle-berries (*Vaccinium Vitis Idæa*), and mosses. In such parts as were rather low grew smaller firs, amongst abundance of birch, the ground there also producing Red Whortle-berries, as well as the common black kind (*Vacoinium Myrtillus*), with *Polytrichum* (*commune*). On the dry hills, which most abounded with large pines, the finest timber was strewed around, felled by the force of the tempests, lying in all directions, so as to render the country in some places almost impenetrable. I seemed to have reached the residence of Pan himself, and shall now describe the huts in which his subjects the Laplanders contrive to resist the rigours of their native climate.

The *Kodda*, or hut, is formed of double timbers, lying one upon another, and has mostly six sides, rarely but four. It is sup-



ported within by four inclining posts, fig. 2. a, as thick as one's arm, crossing each other in pairs at the top, b, upon which is laid a transverse beam, c, four ells in length. On each side lower down is another cross piece of wood, d, serving to hang pipes on. The walls are formed of beams of a similar

thickness, but differing in length, leaving a hole at the top to serve as a chimney, and a door at the side, see fig. 3, a and b. These are covered with a layer of bark, either of Spruce Fir or Birch, and over that is another layer of wood like the first. In the centre, fig. 1, the fire is made on the ground, and the inhabitants lie round it. In the middle of the chimney at fig. 2, c, hangs a pole, on which the pot is suspended over the fire.

The height of the hut is three ells, its greatest breadth at the base two fathoms.

They always construct their huts in places where they have ready access to clear cold springs.

The inhabitants sleep quite naked on skins of reindeer, spread over a layer of branches of Dwarf Birch (*Betula nana*), with similar skins spread over them. The sexes rise from this simple couch, and dress themselves promiscuously without any shame or concealment.

When, as occasionally happens in the

course of the summer, they cannot procure fresh water, and are necessitated to drink the warm sea water, they are infallibly tormented with griping pains, with strong spasms in the region of the stomach, and pain in the lower part of the abdomen, accompanied with bloody urine. This is a species of colic, and is called *ullem*. It generally lasts but one day, rarely two. The same thing happens if they drink before they have broke their fast in a morning.

Every where around the huts I observed horns of reindeer lying neglected, and it is remarkable that they were gnawed, and sometimes half devoured, by squirrels.

At this season the young sprouting horns on the heads of those animals had attained but two or three quarters of an ell in length, covered with a soft and tender skin, so that I noticed, here and there, small drops of blood, from the gnats having stung them. The reindeer has four nipples, besides two spurious ones further back, which very

rarely afford any milk. There are no cutting teeth in its upper jaw. This animal certainly ruminates, as Ray rightly judged, notwithstanding the reports to the contrary collected in his Synopsis of Quadrupeds (*p.* 88, 89). The females are horned as well as the males, which is proper to this order of quadrupeds, but the horns of the females are more slender than those of the other sex.

In the country of Lapmark crawfish as well as fleas are unknown.

In the evening of the 1st of June we came to an island occupied by fishermen. They were peasants from Granoen, a place eight miles distant. They had built themselves a house without a chimney, so that the smoke could escape only by the door. They had however a couch to sleep on.

The fish, of which they had collected about sixteen pounds, was hung up in the hut to dry. It was chiefly Pike, with some Char (*Salmo alpinus*).

The fat parts, with the intestines, after

having been cleaned, are put together till they become sour, when an oil is obtained for the purpose of greasing shoes. The scales and larger fins are collected and dried together. From them is afterwards procured, by boiling, an unctuous substance, into which they dip their fishing-nets, having first dyed or tanned them with birch bark, in order to make them more durable. The spawn of the fish is dried, and afterwards used in bread, dumplings, and what is called *välling* (a sort of gruel made by boiling flour or oatmeal in milk or water). The livers are thrown away, being supposed to occasion drowsiness, and pain in the head, when eaten.

These fishermen had been here six weeks, and intended staying a fortnight longer, when the season of the pike's spawning would be over. They lived during this period chiefly on the spawn and entrails of the fish they caught.

For this fishery these people pay no tax, neither to the crown nor to the native Lap-

lander, who has free access to the water only when these adventurers have left it. Though he himself pays tribute for it, he dares not throw in the smallest net during the stay of his visitors; for, if they find any of his nets, they may throw them up into the high trees, as I was told they often had done.

The poor Laplander, who at this season has hardly any other subsistence for himself or his family, can with difficulty catch a fish or two for his own use. I asked one of them why he did not complain of this encroachment; but was told that having once applied to the magistrate, or judge of the district, the great man told him it was a trifle not worth thinking about; and he esteems the decrees of this exalted personage to be sacred, and altogether infallible, like the oracles of Apollo. He reverences his king as a divinity, and is firmly of opinion that if he were informed of the above grievance it would no longer be suffered to exist.

June 2.

The forest here was full of the noblest pine trees, growing to no purpose with respect to the inhabitants, as the wood is not used even for building huts, nor the bark for food, as it is in some other parts. I wonder they have not contrived to turn these trees to some account, by burning them for tar or pitch.

The colonists who reside among the Laplanders are beloved by them, and treated with great kindness. These good people willingly point out to the strangers where they may fix their abode so as to have access to moist meadows affording good hay, which they themselves do not want, their herds of reindeer preferring the driest pastures. They expect in return that the colonists should supply them with milk and flour.

Ovid's description of the silver age is still applicable to the native inhabitants of

Lapland. Their soil is not wounded by the plough, nor is the iron din of arms to be heard; neither have mankind found their way to the bowels of the earth, nor do they engage in wars to define its boundaries. They perpetually change their abode, live in tents, and follow a pastoral life, just like the patriarchs of old.

Among these people the men are employed in the business of cookery, so that the master of a family has no occasion to speak a good word to his wife, when he wishes to give a hospitable entertainment to his guests*.

The dress of these Laplanders is as follows.

On the head they wear a small cap, like those used at my native place of Stenbrohult, made with eight seams covered with

* When Linnæus wrote this sentence, he seems to have had a presentiment of his own matrimonial fate, just the reverse in this very point of that he was describing.

strips of brown cloth, the cap itself being of a greyish colour. This reaches no lower than the tips of the ears.

Their outer garment, or jacket, is open in front half way down the bosom, below which part it is fastened with hooks, as far as the pit of the stomach. Consequently the neck is bare, and from the effects of the sun abroad and the smoke at home, approaches the complexion of a toad. The jacket when loose reaches below the knees; but it is usually tied up with a girdle, so as scarcely to reach so far, and is sloped off at the bottom. The collar is of four fingers' breadth, thick, and stitched with thread.

All the needle-work is performed by the women. They make their thread of the sinews in the legs of the reindeer, separating them, while fresh, with their teeth, into slender strings, which they twist together. A kind of cord is also made of the roots of spruce fir.

The country bordering on the sea coast hereabouts, in some places consists of grassy pastures, in others of pebbly or sandy tracts. Large stones are rare.

The river of Umoea now began to swell, the weather having been for some days very warm, so as to melt the ice and snow in the frozen regions above. The stream was now so deep and strong that it was not to be navigated without difficulty. In general the strongest flood does not set-in till Midsummer.

This river, as I was informed, has its source in the alps about a mile from the sea of Norway, and empties itself into the gulf of Bothnia at Umoea.

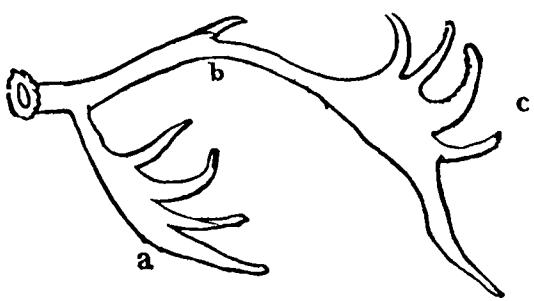
No colonists are to be met with north of this river.

After proceeding for a while up the stream, we went on shore to repose a little at a cottage. The wind blew very cold from the north.

About a year ago a man who lived at

this place had killed his daughter to prevent his son-in-law from inheriting his property.

A tree close to one of the tents was adorned with more than a dozen pair of horns of the male reindeer, or *Brunren*. When castrated, the same animal is called *Ren oxe*. The female is denominated *Kiælfja*.



The horns were shaped as in the annexed figure. The base is compressed and very smooth, not knotty as in the stag. The middle part is curved outward and backward, beyond which the horn is gradually bent forward again and inward. Near the base one, two or three branches project forward, of which some are palmate, hav-

ing from two to five divisions pointing upward (a). At the projecting part in the middle of the horn is a little short simple branch (b). The summit is palmate, having from two to five branches from its back part, which are curved inward (c).

I made some inquiries here concerning the diseases of the people.

They are subject to the *ullem*, or colic, of which I have already spoken, *p.* 127, for which they use soot, snuff, salt, and other remedies. The pain sometimes seizes them so violently that they crawl on the ground while it lasts, not being able to stand or lie still. They are also afflicted with the asthma, the epilepsy, and a swelling of the *uvula*. The husband of a woman who had the last-mentioned disorder, cut away a part of the swelling, but it grew as large again in the course of a twelvemonth. The *prolapsus uteri* also sometimes occurs.

Many persons have the pleurisy, and others rheumatic complaints in the back, which descend down the hips and legs,

leaving the part first attacked. These complaints happen in summer as well as in winter.

We continued our course up the river of Umoea. At length, quitting the main stream, we proceeded along a branch to the right, which bears the name of Juita, and left Lycksele church at about four miles distance, as near as I could guess, for the Laplanders know nothing about the matter.

The inhabitants of this country no longer use bows and arrows, but rifle-guns loaded with bullets, not with small shot.

They wear no stockings. Their breeches, made of the coarse and slight woollen cloth of the country called *walmal*, reach down to their feet, tapering gradually to the bottom, and are tied with a bandage over their half boots.

I observed the Red Whortle-berries (*Vaccinium Vitis Idæa*) were here of a larger size than in the country lower down; but Juniper on the contrary was very diminu-

tive, and grew mostly in fens or watery places. The Crake berries (*Empetrum nigrum*) were as large as the Black Bilberry. Close to a waterfall in Juita Rotogviek or Rootforsen, in a marsh on the right hand, I found Herb Paris (*Paris quadrifolia*), *Aconitum lycoctonum* and *Thalictrum* (*flavum*). But what most surprised and pleased me was the little round-leaved Yellow Violet, with a branched stem, and narrow, smooth, not bearded, petals, described by Morison, which had not before been observed in Sweden (*Viola biflora*).

Several kinds of Willows grew every where near the water, but had not yet displayed their leaves.

I came to a hut, consisting of eighteen posts, covered with *walmal*, or coarse cloth, ten feet long and eight broad. Also some winter huts, the poles of which the Laplanders remove with them from place to place. Each hut is formed with three poles, forked at the top. Under the shelter of

these huts or tents were suspended dried fish, cheese, clothes, pots and various utensils. There were neither walls nor doors, consequently no locks to protect them.

At length meeting with a very long shelvy contraction in the river, we were obliged to quit our boat, and go by land in search of a Laplander to serve as my guide further on, whom we expected to find at a place a mile distant. But it appeared to me full a mile and half, over hills and valleys, rivulets and stones. The hills were clad with Ling and with *Empetrum*, which entangled our feet at every step; not to mention the trees lying in all directions in our way, and over which we were obliged to climb. The marshy spots were not less difficult to pass over. The Bog-moss (*Sphagnum*) afforded but a treacherous support for our feet, and the Dwarf Birch (*Betula nana*) entangled our legs.

I could not help remarking that all the fibres of the full-grown pine trees seemed

to be obliquely twisted, and in a contrary direction to the diurnal motion of the sun. I leave this to the consideration of the curious physiologist; whether it may arise from any thing in the soil or air, or from any polar attraction*.

Some of these pines bore tufted or fasciculated branches near their summits, like those before mentioned, *p.* 7.

At length we came to a sort of bay or creek of the river, which we were under the necessity of wading through. The water reached above our waists, and was very cold. In the midst of this creek was so deep a hole that the longest pole could scarcely fathom it. We had no resource but to lay a pole across it, on which we passed over at the hazard of our lives; and

* It may seem presumptuous to attempt the solution of a question which Linnæus has thus left in the dark; but perhaps the almost continual action of the prevailing strong winds, such as he describes in many parts of his journal, may give a twist to the fibres of these pines during their growth.

indeed when I reached the other side, I congratulated myself on having had a very narrow escape. A neighbouring mountain affords grey slate, but of a loose and brittle kind.

We had next to pass a marshy tract, almost entirely under water, for the course of a mile, nor is it easy to conceive the difficulties of the undertaking. At every step we were knee-deep in water; and if we thought to find a sure footing on some grassy tuft, it proved treacherous, and only sunk us lower. Sometimes we came where no bottom was to be felt, and were obliged to measure back our weary steps. Our half boots were filled with the coldest water, as the frost, in some places, still remained in the ground. Had our sufferings been inflicted as a capital punishment, they would, even in that case, have been cruel, what then had we to complain of? I wished I had never undertaken my journey, for all the elements seemed adverse. It rained and blowed hard upon us. I wondered

that I escaped with life, though certainly not without excessive fatigue and loss of strength.

After having thus for a long time gone in pursuit of my new Lapland guide, we reposed ourselves about six o'clock in the morning, wrung the water out of our clothes, and dried our weary limbs, while the cold north wind parched us as much on one side as the fire scorched us on the other, and the gnats kept inflicting their stings. I had now my fill of travelling.

The whole landed property of the Laplander who owns this tract consists chiefly of marshes, here called *stygæ*. A divine could never describe a place of future punishment more horrible than this country, nor could the Styx of the poets exceed it. I may therefore boast of having visited the Stygian territories.

We now directed our steps towards the desert of Lapmark, not knowing where we went.

A man who lived nearest to the forlorn

spot just described, but had not been at it for twenty years past, went in search of some one to conduct me further, while I rested a little near a fire. I wished for nothing so much as to be able to go back by water to the place from whence I came; but I dreaded returning to the boat the way we had already passed, knowing my corporeal frame to be not altogether of iron or steel. I would gladly have gone eight or ten miles by a dry road to the boat, but no such road was here to be found. The hardy Laplanders themselves, born to labour as the birds to fly, could not help complaining, and declared they had never been reduced to such extremity before. I could not help pitying them.

A marsh called *Lyckmyran* (lucky marsh), but which might more properly be called *Olycksmyran* (unlucky marsh), gives rise to a small rivulet which takes its course to Lycksele, and abounds with ochre. The water is covered with a film.

I am persuaded that iron might be found there.

June 8.

We waited till about two o'clock in the afternoon for the Laplander I had sent on the expedition above mentioned, who at length returned quite spent with fatigue. He had made the requisite inquiries at many of the huts, but in vain. He was accompanied by a person whose appearance was such that at first I did not know whether I beheld a man or a woman. I scarcely believe that any poetical description of a fury could come up to the idea, which this Lapland fair-one excited. It might well be imagined that she was truly of Stygian origin. Her stature was very diminutive. Her face of the darkest brown from the effects of smoke. Her eyes dark and sparkling. Her eyebrows black. Her pitchy-coloured hair hung loose about her head, and on it she wore a flat red cap. She had a grey petticoat; and from her

neck, which resembled the skin of a frog, were suspended a pair of large loose breasts of the same brown complexion, but encompassed, by way of ornament, with brass rings. Round her waist she wore a girdle, and on her feet a pair of half boots.

Her first aspect really struck me with dread; but though a fury in appearance, she addressed me, with mingled pity and reserve, in the following terms:

"O thou poor man! what hard destiny can have brought thee hither, to a place never visited by any one before? This is the first time I ever beheld a stranger. Thou miserable creature! how didst thou come, and whither wilt thou go? Dost thou not perceive what houses and habitations we have, and with how much difficulty we go to church?"

I entreated her to point out some way by which I might continue my journey in any direction, so as not to be forced to return the way I came.

"Nay, man," said she, "thou hast only

to go the same way back again; for the river overflows so much, it is not possible for thee to proceed further in this direction. From us thou hast no assistance to expect in the prosecution of thy journey, as my husband, who might have helped thee, is ill. Thou mayst inquire for our next neighbour, who lives about a mile off, and perhaps, if thou shouldst meet with him, he may give thee some assistance, but I really believe it will scarcely be in his power."

I inquired how far it was to Sorsele. "That we do not know," replied she; "but in the present state of the roads it is at least seven days journey from hence, as my husband has told me."

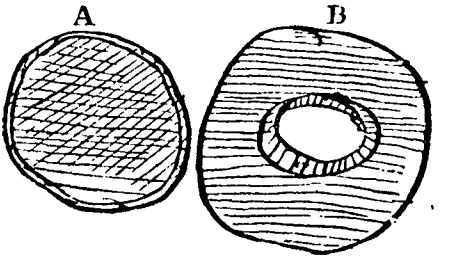
My health and strength being by this time materially impaired by wading through such an extent of marshes, laden with my apparel and luggage, for the Laplander had enough to do to carry the boat; by walking for whole nights together; by not having for a long time tasted any boiled

meat; by drinking a great quantity of water, as nothing else was to be had; and by eating nothing but fish, unsalted and crawling with vermin, I must have perished but for a piece of dried and salted reindeer's flesh, given me by my kind hostess the clergyman's wife at Lycksele. This food, however, without bread, proved unwholesome and indigestible. How I longed once more to meet with people who feed on spoon-meat! I inquired of this woman whether she could give me any thing to eat. She replied, "Nothing but fish." I looked at the fresh fish, as it was called; but perceiving its mouth to be full of maggots, I had no appetite to touch it; but though it thus abated my hunger, it did not recruit my strength. I asked if I could have any reindeer tongues, which are commonly dried for sale, and served up even at the tables of the great; but was answered in the negative. "Have you no cheese made of reindeer's milk?" said I. "Yes," replied she, "but it is a mile off."

" If it were here, would you allow me to buy some?" " I have no desire," answered the good woman, " that thou shouldst die in my country for want of food."

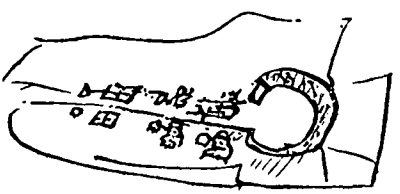
On arriving at her hut, I perceived three cheeses lying under a shed without walls, and took the smallest of them, which she, after some consultation, allowed me to purchase.

The cap of my hostess, like that of all the Lapland women, was very remarkable. It was made of double red cloth, as is usually the case, of a round flat form. The upper side A was flat, a foot broad, and stitched round the edge, where the lining was turned over. At the under side B was a hole to receive the head, with a pro-



jecting border round it. The lining being loose, the cap covers the head more or less, at the pleasure of the wearer.

As to shift, she, like all her country-women, was destitute of any such garment. She wore a collar or tippet of the



breadth of two fingers, stitched with thread, and bordered next the skin with brass rings. Over this she wore two grey jackets, both alike, which reached to her knees, just like those worn by the men.

I was at last obliged to return the way I came, though very unwillingly, heartily wishing it might never be my fate to see this place again. It was as bad as a visit to Acheron. If I could have run up the bed of a river like a Laplander, I might have gone on, but that was impossible.

On my return I observed that the basis of all the tufts of grass, which abound in *mosses* or marshy spots, was the little rushy plant with an entangled root (*Scirpus cæspitosus*) of which I have already spoken. The roots of this vegetable rise every year higher and higher above the soil, so that it seems to have a principal share in forming meadows out of bogs. It is also the basis of all the most remarkable floating islands*.

I heard the note of some Ptarmigans (*Tetrao Lagopus*), which sounded like a kind of laughter. On approaching them I observed that their necks were brown, their bodies white, with three or four brown feathers on the shoulders. Their tails were of a darkish hue†.

* In the *Flora Suecica*, and *Amœn. Acad. v.* 1. 511, these properties are attributed to the *Schœnus Mariscus*, which Scheuchzer in his *Agrostographia, p.* 377, assures us forms the floating islands near Tivoli.

† These birds had partly acquired their summer plumage.

I noticed the Agaric of the Spruce Fir (*Agaricus Fl. Lapp. n.* 517), a flat sessile species, which is the chief remedy used by the Laplanders against gnats, by smoking themselves as well as their reindeer with it. When these insects become very numerous and troublesome, they force the reindeer from their pastures. Even those which have been a whole year away from home are obliged to return. The Laplanders lay small piles of this fungus, every morning and evening, upon the fire in their huts, by which means only they are enabled to sleep at their ease.

I was also shown the Agaric of the Willow (*Boletus suaveolens Fl. Lapp. n.* 522), which has a very fragrant scent. The people assured me it was formerly the fashion for young men, when going to visit their mistresses, to use this fungus as a perfume, in order to render themselves more agreeable*.

* I must here present the English reader with a

The Cloudberry (*Rubus Chamæmorus*) abounded hereabouts, and was now in bloom. The petals varied in number from four to seven. I observed this plant blossoming equally well on the most lofty mountains, as was also the case with the Crake berry (*Empetrum nigrum*).

I again met with the hemipterous insect mentioned *p.* 31, which feeds on fish, and with it another black and dotted one of the coleopterous order, which is seen running with the former among the scales of fish, as well as in the crevices of the floors of

passage on this subject from the *Flora Lapponica*. "The Lapland youth, having found this Agaric, carefully preserves it in a little pocket hanging at his waist, that its grateful perfume may render him more acceptable to his favourite fair-one. O whimsical Venus! in other regions you must be treated with coffee and chocolate, preserves and sweetmeats, wines and dainties, jewels and pearls, gold and silver, silks and cosmetics, balls and assemblies, music and theatrical exhibitions: here you are satisfied with a little withered fungus!"

the Lapland huts. The last-mentioned insect smells like rue. See figure.

An oblong piece of brown cloth is sewed into the back part of the collar of the women's jackets.

June 4.

Adjoining to a hut I remarked some round pieces, apparently of a sort of napped cloth, as black as pitch. Not being able to imagine what they could be, I was informed they were the stomachs or rennet-bags of the reindeer turned inside out, for the purpose of preserving the milk of that animal in a dry state till winter. Before the milk thus preserved can be used, it is soaked in warm water. Some use bladders for the same purpose. In the more mountainous parts they boil sorrel (*Rumex Acetosa*) with the milk which they preserve for winter use.

I wondered, indeed I more than wondered, how these poor people could feed entirely on fish, sometimes boiled fresh, sometimes dried, and then either boiled, or roasted before the fire on a wooden spit. They roast their fish thoroughly, and boil it better and longer than ever I saw practised before. They know no other soup or spoon-meat than the water in which their fish has been boiled. If from any accident they catch no fish, they cannot procure a morsel of food. At midsummer they first begin to milk the reindeer, and maintain themselves on the milk till autumn; when they kill some of those valuable animals, and by various contrivances get a scanty supply of food through the winter.

The young children sleep in oblong leather cradles, without any thing like swaddling-clothes, enveloped in dried bog-moss (*Sphagnum palustre*), lined with the hair of the reindeer. In this soft and warm nest they are secured against the most intense cold.

The winter huts, capable of being removed from place to place, consist of four large curved poles, perforated at the top and fastened two and two together, which being supported by four other straight sticks, form a kind of arch. The whole is covered, except at the very top, where an opening is left for a chimney, with the coarse cloth called *walmar* or *walmal*. The edifice when finished is about four feet high.

Tormentil (*Tormentilla officinalis*) here always grows in boggy ground, which is remarkable. Its root is chewed along with the inner bark of the Alder, and the saliva thus impregnated is applied to leather, to dye it of a red colour. Thus their harness, reins, girdles, gloves, &c. are tanned.

The extensive pine forests here grow to no use. As nobody wants timber, the trees fall and rot upon the ground. I suggested the advantage of extracting pitch and tar from them, but was answered by the judge of the district that, from the remoteness of

the situation, what could be obtained from them would not pay for the trouble. But as no place in the whole Swedish territories can afford so much, and it might easily in winter be conveyed twenty miles, surely it deserves attention.

In a grassy spot near the river I found a rare species of *Ranunculus*, with a three-leaved calyx and a little yellow upright flower, which appears to be nondescript. I met with it but twice or thrice in this neighbourhood and no where else. (This is *R. lapponicus Fl. Lapp. n.* 231. *t.* 3. *f.* 4.)

In the marshes I remarked that what I had previously found on the hills, and taken for a kind of white *Byssus*, had here possessed itself of the tops of the Bog-moss (*Sphagnum*), and bore flesh-coloured shields, so that an inexperienced observer might easily be so far deceived by it as to think those shields the fructification of the *Sphagnum*. (*Lichen ericetorum.* See *Fl. Lapp. n.* 455.)

It is remarkable that the Juniper here

always grows in watery places. The berries are scantily produced, nor are the people of the country at all acquainted with the method of making a spiritous liquor from them, as in other places.

I showed them how to make a kind of brandy of the young tops of the fir, as a little improvement upon their usual watery beverage*, but they thought the scheme impracticable; nor could they conceive it possible to obtain any thing drinkable from the sap of the birch. They seemed determined to keep entirely to water.

I could not observe that the nights were at all less light than the days, except when the sun was clouded.

The poor Laplanders find the church festivals, or days of public thanksgiving, in the spring of the year, very burthensome and oppressive, as they are in general obliged to pass the river at the hazard of their lives. The water at that season is

* Linnæus's words are "to wash down the water."

neither sufficiently frozen to bear them, nor open enough to be navigated; so they are under the necessity of wading frequently up to their arms, and are half dead with cold and fatigue by the time they get to church. They must either undergo this hardship, or be fined ten silver dollars and do penance for three Sundays; which surely is too severe*.

This day I found the very hairy variety of the Purple Marsh Cinquefoil (*Comarum palustre*) mentioned by Plukenet (*t.* 212, *f.* 2). The plants were of the last year's

* This is no new instance of contrariety between the tyranny of man and the gospel of Christ, whose "yoke is easy and his burthen light." If these innocent people were to complain of it to their spiritual guides, they might be told, as on another occasion, see *p.* 130. that "it was a trifle not worth thinking about." We cannot here say with Pope,

"The devil and the king divide the prize,"

but we may presume that the fine is considered as no less indispensable an atonement than the penance.—Pity that such tractable sheep should not be better worth shearing!

growth, and their hairiness the more conspicuous; but it is a mere variety.

The Laplanders never eat but twice a day, often only once, and that towards evening.

On the banks of the river, where fragments are to be found of all the productions of the mountains, I met with silver ore.

The insects which fell under my observation this day were the great Black Humblebee (*Apis terrestris*), the Wasp, the Gnat (*Culex pipiens*), and the Flesh Fly (*Musca carnaria*).

June 5.

On the mountainous ground adjoining to the river I met with an herbaceous plant never before observed in Sweden. The flowers were not yet blown, but appeared within a few days of coming to perfection. I opened some, and found them of a papilionaceous structure. The tip of the standard, as well as of the keel, which was cloven, had a purplish hue. The whole

habit of the plant showed it to be an *Astragalus* (*A. alpinus Fl. Lapp. n.* 267. *t.* 9. *f.* 1.), which was confirmed by the last-year's pods, remaining on their stalks. I called it for the present *Liquiritia minor* (Small Liquorice).

By this time I became almost starved, having had nothing fit to eat or drink for four days past, neither boiled provision of any sort, nor any kind of spoon-meat. I had chiefly been supported by the dried flesh of the reindeer above mentioned, which my stomach could not well digest, nor indeed bear except in small quantities. The fish which was offered me I could not taste, even to preserve my life, as it swarmed with vermin. At length I happily reached the house of the curate, and obtained some fresh meat.

The curate here had caught the Gwiniad (*Salmo Lavaretus*) five palms in length, which is an unusual size. This fish is remarkable for spawning near Lycksele church about Michaelmas, but in the alps

at Christmas, advancing gradually up the river between those two periods after pairing.

The small Gwiniad (*Salmo Albula*) pairs under the ice at this place about Christmas. In Smoland it pairs at Michaelmas.

Reindeer milk is excellent for making cheese, a pail of about three quarts yielding a large quantity. On this account those who keep cows add a portion of it to their milk; by which method they obtain much more cheese than otherwise.

The reindeer suffers great hardship in autumn, when, the snow being all melted away during summer, a sudden frost freezes the mountain Lichen (*L. rangiferinus*), which is his only winter food. When this fails, the animal has no other resource, for he never touches hay. His keepers fell the trees in order to supply him with the filamentous Lichens that clothe their branches; but this kind of food does not supply the place of what is natural to him. It is astonishing how he can get at his proper

food through the deep snow that covers it, and by which it is protected from the severe frosts.

The reindeer feeds also on frogs, snakes, and even on the Lemming or Mountain Rat (*Mus Lemmus*), often pursuing the latter to so great a distance as not to find his way back again. This happened in several instances a few years ago, when these rats came down in immense numbers from the mountains.

The Pike pairs in this neighbourhood as soon as the river becomes open. I met with some strangers who had been six or eight miles, or more, to the north of Lycksele, and had resided there on a fishing party ever since Easter. I accompanied one of them to his hut. Each man had collected about twenty pounds of fish, which were drying.

It is certainly very unjust that these people, settled more than eight miles down the country on the other side of Lycksele church, should drive the native Laplanders

away, and be allowed to fish in these upper regions, which have no communication with the sea shore, and this without paying any tax to the crown or tithe to the curate of the parish, which the fishermen of the country are obliged either to do, or to farm the fishery of the land-holder, who pays tribute for his land, and who justly complains of the hardship he suffers in various respects, without daring to make any open resistance.

When any of these complaints were made by the Laplanders in my hearing, I asked why they did not seek redress in a proper manner.

"Alas!" replied they, "we have no means of procuring access to our sovereign. Nobody here exercises any authority to protect us, or to prevent these interlopers from doing with us just as they please. We cannot procure witnesses in our favour, scattered about as we are in an unfrequented desert, and therefore we are robbed with impunity. We can never believe that

this happens with the approbation of our Gracious Sovereign. If we were assured that it was his will, we should submit with dutiful resignation."

The clergy also complained to me that, after having resided in this wilderness, and fulfilled the duties of their calling with all possible care and diligence, they are never in the way of promotion, like those employed in schools, or any other station, where they are more at hand to solicit preferment. Indeed it seems very just, that, after having served here for twenty years, they should obtain some small preferment in a more cultivated country, where their children might be properly educated, and enjoy the advantages of civilized society.

A schoolmaster at this time resident here, who had exerted himself in the most exemplary manner, so as to do as much in two years as his predecessor had done in ten, with respect to teaching Swedish to the children of the Laplanders, a task harder than that of the plough, had no

other prospect than still to remain in obscurity, even his great merit not being likely to procure him any further advancement.

In the forests of this neighbourhood good pasturage is now and then to be found, but the corn-fields and meadows are poor, especially the former. After the marshes have been mowed one season, or at most two, they produce no more grass. The Bog-moss (*Sphagnum*) overruns them, and renders them barren. Surely this extensive country might be as well cultivated as Helsingland, which is equally mountainous, and in other respects less fit for improvement than this. I have noticed large tracts of loose bog or moss land, which I am persuaded would make excellent meadows, if any drain, though ever so small, were made to carry off the water. This, I was told, had been tried in some instances, but that no grass grew on the land in consequence of it; on the contrary, the whole was dried up and barren. This arises from

the turfy roots of the rushy tribe of plants, which, though killed by the draining, still occupy the ground.

As to the pine forests, if the superfluous part of them were felled, and birch trees permitted to grow in their stead, a better crop of grass would consequently be produced. When the country is mountainous, this would be attended with less success; but with least of all where the soil is of the barren sandy kind (*Arena Glarea*), of which I have already spoken several times in the course of my tour. On such a soil, after the burning of a pine forest, nothing grows for the ensuing ten or twenty years. But might not even this dreary soil be improved by felling the trees, and leaving them to rot upon the ground, so as to form in process of time a layer of vegetable mould? In Scania, Buck-wheat (*Polygonum Fagopyrum*) is sown on a sandy soil, but here the climate is too severe. Yet perhaps some other plant might be found to cultivate even here. It would be very de-

sirable to discover some means of eradicating the Bog-moss.

The reason why the marshes prove barren, after the grass has been mown, is easily explained by considering the nature of the rushy plants, whose roots extend themselves gradually upwards, and choke the *Carices* and other grasses, when the latter are cut down to the ground, so that their roots wither. Might this evil be cured by burning?

I wondered that the Laplanders hereabouts had not built a score of small houses, lofty enough at least to be entered in an upright posture, as they have such abundance of wood at hand. On my expressing my surprise at this, they answered: "In summer we are in one spot, in winter at another, perhaps twenty miles distant, where we can find moss for our reindeer." I asked "why they did not collect this moss in the summer, that they might have a supply of it during the winter' frosts?" They replied, that they give their whole attention to fish-

ing in summer time, far from the places where this moss abounds and where they reside in winter.

These people eat a great deal of flesh meat. A family of four persons consumes at least one reindeer every week, from the time when the preserved fish becomes too stale to be eatable, till the return of the fishing season. Surely they might manage better in this respect than they do. When the Laplander in summer catches no fish, he must either starve, or kill some of his reindeer. He has no other cattle or domestic animals than the reindeer and the dog: the latter cannot serve him for food in his rambling excursions; but whenever he can kill Gluttons (*Mustela Gulo*), Squirrels, Martins, Bears or Beavers, in short any thing except Foxes and Wolves, he devours them. His whole sustenance is derived from the flesh of these animals, wild fowl, and the reindeer, with fish and water. A Laplander, therefore, whose family consists of four persons, including

himself, when he has no other meat, kills a reindeer every week, three of which are equal to an ox; he consequently consumes about thirty of those animals in the course of the winter, which are equal to ten oxen, whereas a single ox is sufficient for a Swedish peasant.

The peasants settled in this neighbourhood, in time of scarcity eat chaff, as well as the inner bark of pine trees separated from the scaly cuticle. They grind and then bake it in order to render it fit for food. A part is reserved for their cattle, being cut obliquely into pieces of two fingers' breadth, by which the fodder of the cowc, goats, and sheep is very much spared. The bark is collected at the time when the sap rises in the tree, and, after being dried in the sun, is kept for winter use. They grind it into meal, bake bread of it, and make grains to feed swine upon, which render those animals extremely fat, and save a great deal of corn.

The Laplanders dye their wool red chiefly with the Blood-root or Tormentil, *Tormentilla erecta.* A red colour is given to their leather by means of fir bark. The men wear a kind of trowsers which reach down to their feet, and are tied round their half boots, so as to keep out water. They wear no shirt nor stockings. The waist-band is fastened by thongs, not buttons.

As to the diseases of these people, I was informed here that fevers are very rare indeed, and that the smallpox is also of unfrequent occurrence. Hence, when it does come, many old people with grey hairs fall a sacrifice to the latter disorder, which however is not widely communicated, any more than fever, because of the very thin population. Of intermittent fever I met with only one example, and of *calculus* another. They cure a cough by sulphur laid on the lighted fungus which serves them as tinder, or on the fire, the smoke of which inhaled into the lungs is esteëmed

a specific; but it is a very fallacious one. For the headache a small bit of the aforesaid fungus is laid on the place where the pain is most violent, and, being set on fire, it burns slowly till the part is excoriated. This therefore is the *Moxa* of the Laplanders. In case of a *prolapsus uvulæ* they cut off the protuberance with a pair of scissars. For the colic or belly-ache they rub the nails with salt, besides which they administer oil internally.

I here satisfied myself about the native species of *Angelica*, which are two only, not three. The Biœrnstut is *Angelica sylvestris*, the Botsk *A. Archangelica*. (See *Flora Lapponica*, *n.* 101, 102.)

The bountiful provision of Nature is evinced in providing mankind with bed and bedding even in this savage wilderness. The great Hair-moss (*Polytrichum commune*) called by the Laplanders Romsi, grows copiously in their damp forests, and is used for this purpose. They choose the starry-headed plants, out of the tufts of

which they cut a surface as large as they please for a bed or bolster, separating it from the earth beneath; and although the shoots are scarcely branched, they are nevertheless so entangled at the roots as not to be separable from each other. This mossy cushion is very soft and elastic, not growing hard by pressure; and if a similar portion of it be made to serve as a coverlet, nothing can be more warm and comfortable. I have often made use of it with admiration; and if any writer had published a description of this simple contrivance, which necessity has taught the Laplanders, I should almost imagine that our counterpanes were but an imitation of it. They fold this bed together, tying it up into a roll that may be grasped by a man's arms, which if necessary they carry with them to the place where they mean to sleep the night following. If it becomes too dry and compressed, its former elasticity is restored by a little moisture.

June 6.

In order to observe how fast the water rose in the river, which was increasing daily, I had fixed a perpendicular stick the preceding evening at eight o'clock close to the margin of the stream. This morning at five it had gained a foot in depth and two feet in breadth. Near the bank, which is continually undermining in some part or other by the current, stones are found incrusted with sand, coagulated as it were about them by means of iron. Some of them seem as if they had been blown to pieces with gunpowder.

I was told that the peasants had in the winter preceding foretold an unusual rise of the river, and a great flood, in the course of this summer, which when it happens is a considerable detriment to those whose pasture grounds are overflowed by it. Their mode of judging is by the swelling of the stream in winter, to which they

observe that in the ensuing summer always to bear a proportion.

The colonists settled in Lapmark sow a great deal of turnip seed, which frequently succeeds very well and produces a plentiful crop. The native Laplanders are so fond of this root, that they will often give a cheese in exchange for a turnip; than which nothing can be more foolish.

At Gräno I met with perfectly white flowers of the Dog's Violet (*Viola canina*): also *Bistorta alpina sobolifera*, or more properly perhaps *vivipara* (*Polygonum viviparum*), as the bulbs had grown out into small leaves.

Rain fell in the night, accompanied with thunder and lightning.

June 7.

Early in the morning I left Gräno, and in passing through the forest observed on the Juniper magnificent specimens of that gelatinous substance, about which and its

heroic virtues in curing the jaundice so much has been said*. I picked up a curious insect which I then named *Cantharis niger maculatus et undulatus* (*Cicindela sylvatica*), and which I afterwards met

with in great abundance throughout the pine forests of this province, though rare elsewhere, flying or running with great celerity along the roads and paths. Here also it was my fortune to see a rare bird not hitherto described. If I am not mistaken, it is what Professor Rudbeck called *Pica Lapponum*. I could only examine it through my spying-glass, but I perceived

* *Tremella juniperina* of Linnæus, *T. Sabinæ* of Dickson: see *English Botany*, *v.* 10. *t.* 710, which I am persuaded is merely an exudation from the shrub that bears it.

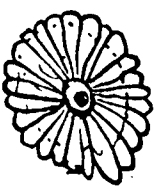
all the characters of a *Turdus*, so that I do not scruple to define it *Turdus caudâ, rubrâ medio cinereâ.* It had moreover the flight and voice of a *Turdus*, screaming in the same manner. Towards evening I noticed a black sort of Plover, with legs of a yellowish green, and had also an opportunity of killing a Lomm (*Colymbus arcticus*), which I stuffed, and of which I made a description in my ornithological manuscript. The bill was not toothed.

Towards evening I reached Stocknasmark and Iamtboht, where grew the pretty little *Cameraria* of Ruppius and Dillenius (*Montia fontana*), a plant that had never fallen in my way before. In Källheden it was peculiarly abundant, and afterwards I found it common throughout Westbothnia. It is one of the smallest of plants.

The Laplanders in this neighbourhood had set traps to catch squirrels. Each consists of a piece of wood cloven half way down, and baited with a piece of dried fungus with which the animal is enticed.

The fungus used for this purpose is an Agaric with a bulbous stalk and crimson cap (*A. integer β. Sp. Pl.*).

In the huts I observed suspended over the tables two tails of the great female Wood Grous (*Tetrao Urogallus*), spread so as to make a kind of circular fan, which had a handsome appearance.



The Little Cotton-Grass (*Eriophorum alpinum*) and the *Mesomora* (*Cornus suecica*) grow abundantly in this neighbourhood. About the water were several *Ephemeræ*. I also caught a little insect of the beetle (or coleopterous) kind, the shells of which were red, the thorax blue with a red margin, the whole shining with a tinge of gold. In Lapland are scarcely any fleas, no bugs, though plenty of lice, nor any frogs nor serpents.

June 8.

Very early in the morning I set out again on my journey, and in my way examined the Palmated Orchis with a green or pale flower, differing from all others in the shape of its nectary, which is like a bag and not a spur. Hence I have referred it to *Satyrium* (*S. viride*). It connects that genus with the real *Orchides* with palmate bulbs*.

I remarked that all the women hereabouts feed their infants by means of a horn, nor do they take the trouble of boiling the milk which they thus administer, so that no wonder the children have worms. I could not help being astonished that these peasants did not suckle their children.

About four o'clock in the afternoon I found myself once more at the town of Umoea. Large flies like gnats with great

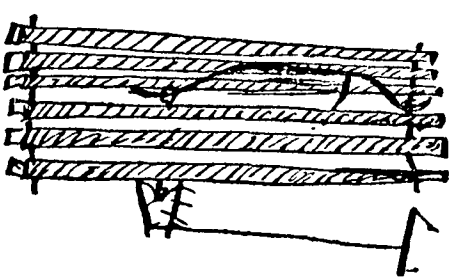
* The more correct characters, founded by Haller and Swartz on the anthers, reduce this plant very successfully to the genus *Orchis*, with *Satyrium hircinum* likewise.

black wings were flying about in the air, which I had before taken, May 27, for some species of *Musca*; but their peculiar flight now gave me another opinion, which was strengthened by the form of their poisers (*halteres*) and the round entire figure of their wings. (*Empis borealis*). Here I found a curious Ladybird (*Coccinella trifasciata*) of an orange colour, with oblong, not round, spots.

A remarkable change had taken place in the appearance of the country during the fortnight which had elapsed since I was here before. The Aspen trees were then quite leafless; now they were in full foliagé; the grass was very dry, and about a quarter (of an ell?) high.

It is a general practice throughout Lapland in the autumn to set traps in the more unfrequented parts of the woods to catch the Wood Grous (*Urogallus*). Some of these traps were still remaining, but I could never properly observe their construction till I met with one in the course

of this day's journey. This machine consists of six parallel pieces of wood, each at a little distance from the next, and all joined together by a transverse piece at each end. Over them the twig of a tree is placed horizontally, one end of it being fastened to the frame, the other introduced into a loop holding a weight. An upright splinter of wood is made to support this twig in an arched position, so that when the bird goes under it to roost, or otherwise touches the splinter, the latter falls down, and the bird is caught.



This being a day of public thanksgiving, I remained at Umoea.

Agues are very uncommon in this country, but St. Anthony's fire seems to be pro-

portionably more frequent, insomuch that every body complains of being troubled with it. At Upsal and Stockholm agues are common, and at Lund acute fevers terminate in that complaint.

Throughout Lycksele Lapland there are no other domestic animals than Reindeer and Dogs. The latter are generally of a hoary grey colour, and a middling size.

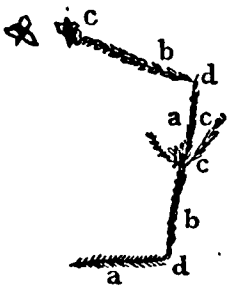
The Laplanders use no artificial beverage.

June 9.

Near the town of Umoea, in a springy spot on the side of a hill, I met with three or four curious species of moss.

1. A kind of *Hypnum* or *Polytrichum*, with a branched stem bearing flowers in the form of shields. (*Mnium fontanum Sp. Pl. Bartramia fontana Fl. Brit.* The male plant.)

From the root arises an oblique stem (a) about half an inch long, entirely clothed with very sharp-pointed leaves. From



thence the main stem (b) grows perpendicularly to the height of an inch, of a purple colour, clothed with ovate, acute, membranous, whitish scales, each half embracing the stem. Between the bases of these is a solitary line or rib, into which they are inserted in an alternate order. I imagine the oblique part of the stem (a) to be of autumnal or winter growth, and the upright portion (b) to have been put forth in summer or spring. At the summit of the latter stands a sort of blossom (c), composed of six scales, of which the three lower are opposite and shortest; the three upper larger, ovate, pointed, somewhat

spreading, permanent, of a whitish green colour. Within these scales or petals is a flat, or slightly convex, disk, composed of innumerable very slender whitish filaments with reddish tips, much shorter than the surrounding scales. Can these filaments be the stamens? They are by no means rudiments of leaves. One, two or three branches grow out at the base of this flower, the latter being for the most part perennial, and go through the same mode of growth and flowering as the parent plant. The calyx therefore, contrary to the nature of the common *Polytrichum*, is proliferous from its base.

It is curious that all the flowers, in each tuft composed perhaps of a hundred plants, rise exactly to the same level. It is also remarkable that the new stems form a similar angle to that made by the growth of the preceding year (d), so that the whole assemblage of them is as regularly disposed as a body of soldiers.

2. This moss (*Bartramia fontana*, the female plant) agrees in many respects with the preceding, but differs in the following particulars. The roots or shoots of the preceding year are quite black, while those of the present season are of a paler or whitish green; nor are the scaly leaves so far remote from each other as that the red stem appears so regularly between them. The plants are also more branched, and less curved. In the last place, this is a fruit-bearing kind, having purple stalks

two inches long, each of which sustains a globular head, larger than usual in mosses, bent obliquely, and of a green colour. The *calyptra* or veil is remarkably small, smooth, and membranous.

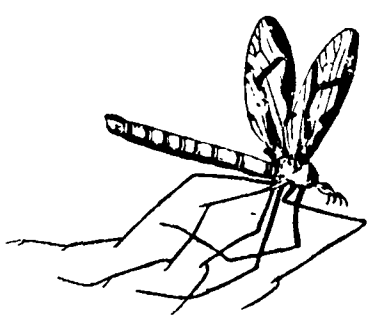
3. is a moss (*Bryum bimum Fl. Brit. Engl. Bot. t.* 1518.) whose stem and leaves partake of a blood-red hue. The latter are regularly and alternately imbricated, oblong, pointed; the upper ones forming a head at the summits of the branches, as in No. 1, but the disk is not exposed, for the lower leaves which surround it are the longest, and the inner ones shortest, just the reverse of No. 1. This No. 3 therefore is the male, and No. 4 the female, both found on the same plant*. The latter

* Here we find the Hedwigian theory of the fructification of mosses forestalled by the good sense and accurate observation of Linnæus, though out of respect for Dillenius he soon after adopted the erroneous opinion of the latter, making what is really the male the female, and *vice versa*. See Transactions of the Linnæan Society, *v.* 7. 255. Not being able to investigate every point of systematical and physiological

bears, on a long purple stalk, greenish at the upper part, an oblong pear-shaped pendulous head (or capsule). The veil is very small.

5. is a small *Lichen* or *Marchantia* (*Riccia*) with oblong leaves, contracted in the middle, sprinkled with brown powder.

The annexed figure represents a large kind of gnat caught in the same place (*Tipula rivosa*).



June 10.

(Here occur in the manuscript long Latin descriptions of *Rubus arcticus* and *Betula*

botany thoroughly himself, he, with amiable deference, often trusted to those who had more particularly studied certain subjects.

nana, which are printed in a more finished state in the *Flora Lapponica*, *ed.* 2. 170 and 274.)

June 11.

Being Sunday, and a day of continued rain, I remained at Umoea.

June 12.

I took my departure very early in the morning. The weather was so hazy I could not see the distance of half a gun-shot before me. I wandered along in a perpetual mist, which made the grass as wet as if it had rained. The sun appeared quite dim, wading as it were through the clouds. By nine o'clock the mists began to disperse, and the sun shone forth. The Spruce Fir (*Pinus Abies*), hitherto of an uniform dark green, now began to put forth its lighter-coloured buds, a welcome sign of advancing summer*.

* Linnæus, in the *Amœnitates Academicæ*, says the Swedish summer is in its highest beauty when "the fresh shoots of the fir illuminate the woods."

Chamædaphne of Buxbaum (*Andromeda polifolia*) was at this time in its highest beauty, decorating the marshy grounds in a most agreeable manner. The flowers are quite blood-red before they expand, but when full-grown the corolla is of a flesh-colour. Scarcely any painter's art can so happily imitate the beauty of a fine female complexion; still less could any artificial colour upon the face itself bear a comparison with this lovely blossom. As I contemplated it I could not help thinking of Andromeda as described by the poets; and the more I meditated upon their descriptions, the more applicable they seemed to the little plant before me, so that if these writers had had it in view, they could scarcely have contrived a more apposite fable. Andromeda is represented by them as a virgin of most exquisite and unrivalled charms; but these charms remain in perfection only so long as she retains her virgin purity, which is also applicable to the plant, now preparing to celebrate its nup-

tials. This plant is always fixed on some little turfy hillock in the midst of the swamps, as Andromeda herself was chained to a rock in the sea, which bathed her feet, as the fresh water does the roots of the plant. Dragons and venomous serpents surrounded her, as toads and other reptiles frequent the abode of her vegetable prototype, and, when they pair in the spring, throw mud and water over its leaves and branches. As the distressed virgin cast down her blushing face through excessive affliction, so does the rosy-coloured flower hang its head, growing paler and paler till it withers away. Hence, as this plant forms a new genus, I have chosen for it the name of *Andromeda**.

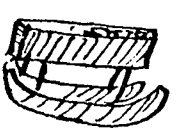
Every where near the road grew the *Mesomora* or Herbaceous Cornel (*Cornus*

* Linnæus has drawn this fanciful analogy further in his *Flora Lapponica*. "At length," says he, "comes Perseus in the shape of Summer, dries up the surrounding water and destroys the monsters, rendering the damsel a fruitful mother, who then carries her head (the capsule) erect."

suecica, very minutely described in *Fl. Lapp. ed.* 2. 39. See also *English Botany*, *v.* 5. *t.* 310.).

All the little woods and copses by the road side abounded with Butterflies of the Fritillary tribe, without silver spots. The great Dragon Fly with two flat lobes at its tail (*Libellula forcipata*), and another species with blue wings (*L. Virgo*), were also common.

Various modes of rocking children in cradles are adopted in different places. In Smoland the cradle is suspended by an elastic pole, on which it swings up and down perpendicularly. The poorer Laplanders rock their infants on branches of trees, but those of superior rank have cradles that commonly roll from side to side. In the part of the country where I was now travelling, the cradles rock vertically, or from head to foot, as in the figure.



Close to the road hung the under jaw of a Horse, having six fore teeth, much worn and blunted, two canine teeth, and at a distance from the latter twelve grinders, six on each side. If I knew how many teeth and of what peculiar form, as well as how many udders, and where situated, each animal has, I should perhaps be able to contrive a most natural methodical arrangement of quadrupeds*.

I could not help remarking that the very best fields of this part of the country, in which from six to ten barns commonly stood, were almost entirely occupied with turfy hillocks producing nothing but Hair-moss, *Polytrichum*, and that quite dried up. Some of the barns were evidently in a decayed state; which made me suspect this condition of the land to be an increasing evil, and that it had formerly been more productive than at present. Indeed

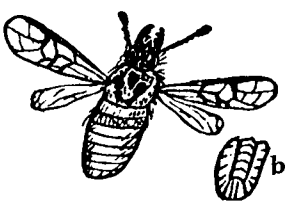
* Here the Linnæan system of *Mammalia* seems first to have occurred to the mind of its author.

some of these tumps were so close together that no grass had room to grow between them. If the cause of this evil, and a cure for it, could be discovered, the husbandman would have reason to rejoice. Wherever these hillocks abounded, the earth seemed to be of a loose texture, consisting of either mud or clay. When I stepped upon them they gave way, and when cut open they appeared all hollow and unsound. I conceive the frost to have a great share in their formation, which when it leaves the ground causes a vacuity, and the turf, loosened from the soil, is raised up.

The insects which occurred to my notice this day, besides those above mentioned, were the following:

A black *Ichneumon*, like a Humble Bee, with club-shaped antennæ four lines long, and blueish wings. Its mouth armed with a pair of toothed forceps. Thorax hairy, with several smooth spots interspersed. Abdomen depressed, ovate, rough at the

base with greyish hairs, and furnished with a series of scales beneath, see fig. b. Feet pale red, otherwise the general colour of the insect is black. It lives on the willow. (This appears to be the *Tenthredo lucorum*, a species not preserved in the Linnæan cabinet.)



A small *Papilio*, of the fritillary tribe, with one silver mark underneath of the form of a shield. See it among those of Petiver collected in Portugal. (This must surely be *Papilio* C *album*.)

A greyish Butterfly with feathered antennæ, whose female has no wings. See Swammerdam. (*Phalæna antiqua.*)

An elegant little blackish Butterfly, besprinkled with snow-white spots like rings, smooth and polished on the under side, was very plentiful in the paths.

A black *Tipula* was running over the water, and turning round like a *Gyrinus* or Water Flea. (*Cimex lacustris.*)

In the wells, the *Swammerdamia* of Swammerdam and Lister ran about with great velocity. Among these was a very minute insect, which I could not ascertain.

An *Elasticus*, (*Elater*, probably the *æneus*,) of a golden black, with striated cases to the wings, and geniculated antennæ.

A reddish *Cantharis*, with black antennæ, and light grey cases to the wings.

I now entered the territory of Pithoea. It rained about eleven o'clock for half an hour, otherwise the day was fine.

PITHOEA.

June 13.

A VERY bright and calm day. The great Myrgiolingen* was flying in the marshes.

* What this word expresses I am unable to determine.

The country here is rather flat, yet now and then considerable hills present themselves, not very high indeed, but abounding in steep declivities. The stones about these hills were variegated, and as if inlaid, glittering with talc; many of them rusty, and spontaneously corroded. On one spot, in the road itself, is produced a brown pale-purplish earth, which is very likely to be useful for painting. The hill where this earth or ochre is found is called Hógmarkbœrget.

At the post-houses of Gremers-mark and Sela, I was told of a mountain about two miles distant, reported to contain copper. Three years previous to my travelling this way, a man had been sent by the Board for Mining Affairs to investigate this mountain; but the peasants of the neighbourhood, in consequence of the threats of the burghers of Umoea, were deterred from giving him proper directions, and put him on a wrong scent. They kept this stranger

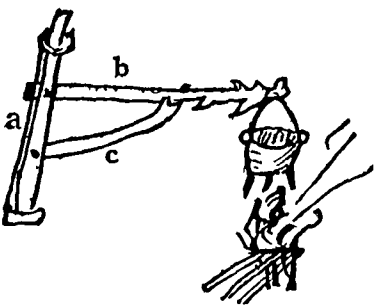
from the knowledge of Hans Person, a peasant at Webomark, who would have conducted him right. The father of this Hans was the first discoverer of the mountain in question, and undertook a journey to Stockholm with a small barrel of the ore; but before he set off, his neighbours made him drunk, and took out the proper ore, replacing it in his barrel with lumps of granite. His son is now at all times ready to show the mountain to any one who inquires for it, and I had some thoughts of going to find out this man, though his residence was far out of my road. Learning however that he was not now at home, but employed somewhere at a distance in building or repairing a bridge, I thought it useless to inquire any further.

At some few places at which I stopped for refreshment in the course of this day's journey, I procured some of that preparation of milk called *Sätmiolk*, by some people *Tätmiolk*. In the neighbourhood grows the

plant called *Tätgrass*, or *Pinguicula*, with its most curiously constructed flower. When the inhabitants of these parts once procure this plant, they avail themselves of it during the whole year; for they preserve it dried through the winter, and use it as a kind of rennet till the return of spring.

Here also I learned another preparation of milk. After cheese is made, the whey is boiled and skimmed, which operation is repeated till a sediment forms as thick as flummery. This is afterwards dried, and kept in casks for use. It makes an ingredient in bread, and is called *Mesosmör*.

The fire-places here were furnished with a regular apparatus for boiling the kettle. The Laplanders in general content themselves for this purpose with a large stick, which they place obliquely in the ground, so as to lean over the fire, and on which they suspend either a kettle or a fish; but here they have adopted quite another mode.



A square beam (a) is placed perpendicularly, so as to be turned upon a pivot at its base. To this a transverse beam (b) is fixed by a peg or joint, so that its extremity may be moved up or down, and teeth are cut in this beam, to hang the kettle upon, at a greater or less distance from the upright support. Underneath is another shorter piece of wood (c), forked at the extremity to catch the lower teeth of the last-mentioned beam, and fixed likewise by a joint at its base, in order to be elevated more or less at pleasure. The advantages of this contrivance are many.

1, the materials cost nothing, whereas any iron machinery is expensive.
2, here is no waste, for iron may be employed to more important purposes.
3, this is capable of being raised higher or lower according as the height of the fire may require, which an iron trivet cannot.
4, the iron trivet is troublesome to move about, which this machine does not require.
5, when the trivet happens to lose one of its feet, it is no longer of any use.
6, the circular part of the iron trivet must be proportioned to the size of the kettle it is to support, but this machine will hold any sized kettle.

The fields in this part of the country are excellent, being extensive and level, the soil consisting of sandy and argillaceous earth. The crops are abundant, provided the corn be not injured by frost, as it had

been the preceding year. Owing to this misfortune, I found bread made of spruce fir bark at present in general use. The Buckbean (*Menyanthes trifoliata*) is very seldom used, on account of its bitterness*.

Flax is scarcely ever cultivated here.

In the evening I strolled out from the post-house at Bumoen towards the sea side in search of natural productions. The brooks close to the shore swarmed with innumerable little oval *Notonectæ* (Boat-flies), no bigger than nits (*N. minutissima*);

* Linnæus in the *Flora Lapponica, ed.* 2. 53, tells us that "in times of extreme scarcity the roots of this plant, dried and powdered, are mixed with a small quantity of meal, and serve to make the miserable bread of the poorer settlers in Lapland, which is extremely bitter and detestable." In the same work, *p.* 259, he describes an excellent kind of bread made of the roots of *Calla palustris*, which though acrid when fresh, become wholesome if dried, and boiled afterwards in water, as is the case with its near relation our common *Arum*, and the *Jatropha Manihot*, or Casava, of the West Indies.

as well as with the lesser ovate *Dytiscus*, shaded with grey, and known by its blunt cloven *sternum*. (*D. cinereus.*) On the beach multitudes of black insects without wings, and half covered with shelly cases, were running about. (Probably *Cimex littoralis.*) There were also abundance of *Ephemeræ* (May-flies), all which had two prominent fore feet, and three bristles at the tail. I caught several, thus rendering their transient existence still shorter. They were of two species, one larger, of a blackish hue, with dark clouded wings (*E. vulgata*); the other about half as large, with a blackish thorax, and white wings. (This does not agree with any species in the *Fauna Suecica.*)

Not far from the shore, on a small elevation, where the trees and underwood had lately been burnt down, grew the Strawberry-leaved Bramble (*Rubus arcticus*) with jagged petals, a remarkable and elegant variety. (See *Fl. Lapp. t. 5. f. 2.*)

June 14.

It rained very hard in the course of this day, as well as in the preceding night.

The cornfields hereabouts vary in soil, being sometimes clay or sand, sometimes a good mould, and often a mixture of all three. In general they yield some kind of a crop, whatever the weather may be, except it should prove severely cold, which is the ruin of the country.

The forests are beautiful, consisting of Spruce Fir, Common Fir, and plenty of Birch, so that no part of Sweden is more pleasant to travel through while the summer lasts.

The principal subsistence of the inhabitants is derived from selling deals. The price is sixteen silver styvers (about three English farthings each) for a dozen of deals. Tar is sold at six dollars, copper money, a barrel.

I wish those who deny that certain plants

are peculiar to certain countries could see how abundantly the Birch, the Lapland Willow, the Strawberry-leaved Bramble, the Cloud-berry (*Rubus Chamæmorus*), and the Thyme-leaved Bell-flower (*Linnæa borealis*) flourish in this district, and how the *Ranunculus acris* entirely covers the pasture lands with its brilliant yellow flowers.

On arriving at the post-house of Sunnanaen, I was gratified with the view of a fine river, and the very neat little town of Skelleftea, consisting of two principal streets and several cross ones, with a church. The houses are about three hundred and fifty or four hundred, and their white chimneys give them a cheerful aspect. I was informed that every peasant in the parish had a house of his own in the town, for the use of his family during festivals*.

* In Törner's work on the Geography of Sweden is the following curious account: "Skelleftea, a parish consisting of about one hundred and fifty whole farms (in Swedish *hemman*), and containing four thousand

Proceeding a little further, I remarked a steep hill near the road carefully covered over with boughs of spruce fir. On removing some of these, the ground evidently appeared to have been broken up, and apparently blasted with gunpowder. This should seem to have been done by some one in search of ore, of which however I could not perceive the least indication. I carried away a few specimens of the rock.

After passing the next post-house, I was ferried over a river about half way towards the third, when an Owl appeared, flitting every now and then, at short distances, before me. Laying hold of my gun, I ventured to take aim, though my horse kept going on at a good rate. It was a

souls, is situated near a cove or arm of the sea, in which is an island, formerly of considerable extent but now very small. St. Stephen is said to have prophesied that the day of judgment will come as soon as this island is entirely washed away. The island certainly diminishes yearly, but every one must judge for himself as to the probability of the prophecy."

quarter past twelve at night, yet not at all dark. I was lucky enough to hit the bird, but in such a manner that one side of it was too much damaged to allow of stuffing and preserving the specimen. (This was the *Strix Ulula*, the Latin description of which, made on the spot, is given, somewhat corrected, in the *Fauna Suecica*; but the annexed sketch is too great a curiosity to be suppressed).

Just as I was about to draw up a description of this Owl, a little Beetle crept out of its plumage. It was evidently a *Scarabæus* by its antennæ. The whole body was oblong, shaded with blue and black; the belly white. When touched or alarmed, it lay perfectly still. (Probably *Dermestes murinus*.)

Near the road lay a trap to catch Salmon, made of long slender laths, bound together with six flexible twigs of osier into a cylindrical form, open at the base, and furnished with twigs in that part placed like the wires of a mousetrap, but in a double row, that they might be so much the stronger. The open space between them was enough to admit a man's head. On one side further on was a door to take out the fish when caught.

Oniscus aquaticus was in the water.

The Dean of Skelleftea told me an anecdote of a Laplander who, at the last court of justice held there, summoned his neigh-

bour for having twice as much land, without paying any greater share of taxes than himself. The man summoned was of course sentenced to pay double what he paid before. This provoked him so much, that he immediately gave information of a vein of silver on his own estate, in consequence of which he was, by the fundamental laws of the realm, exempt from all taxes whatsoever. He then went to his adversary in triumph, exclaiming, "See how matters go now! I am exempt from taxes, but how is it with you?"

June 15.

This day afforded me nothing much worthy of notice. The sea in many places came very near the road, lashing the stony crags with its formidable waves. In some parts it gradually separated small islands here and there from the main land, and in others manured the sandy beach with mud. The weather was fine.

In one marshy spot grew what is proba-

bly a variety of the Cranberry (*Vaccinium Oxycoccus*), differing only in having extremely narrow leaves, with smaller flowers and fruit than usual. The common kind was intermixed with it, but the difference of size was constant. The *Pinguicula* grew among them, sometimes with round, sometimes with more oblong leaves.

The Bilberry (*Vaccinium Myrtillus*) presented itself most commonly with red flowers, more rarely with flesh-coloured ones. *Myrica Gale*, which I had not before met with in Westbothnia, grew sparingly in the marshes.

In the evening, a little before the sun went down, I was assailed by such multitudes of gnats as surpass all imagination. They seemed to occupy the whole atmosphere, especially when I travelled through low or damp meadows. They filled my mouth, nose and eyes, for they took no pains to get out of my way. Luckily they did not attack me with their bites or stings, though they almost choked me. When

I grasped at the cloud before me, my hands were filled with myriads of these insects, all crushed to pieces with a touch, and by far too minute for description. The inhabitants call them Knort, or Knott, (*Culex reptans*, by mistake called *C. pulicaris* in *Fl. Lapp. ed.* 2. 382.)

Just at sunset I reached the town of Old Pithoea, having previously crossed a broad river in a ferry boat. Near this spot stood a gibbet, with a couple of wheels, on which lay the bodies of two Finlanders without heads. These men had been executed for highway robbery and murder. They were accompanied by the quartered body of a Laplander, who had murdered one of his relations.

Immediately on entering the town I procured a lodging, but had not been long in bed before I perceived a glare of light on the wall of my chamber. I was alarmed with the idea of fire; but, on looking out of the window, saw the sun rising, perfectly red, which I did not expect would take

place so soon. The cock crowed, the birds began to sing, and sleep was banished from my eyelids.

June 16.

This morning I made an excursion to the northward, in order to examine a well, reported to be of a mineral nature. It is situated about half a quarter of a mile from Old Pithoea, and seemed to me only a common cold spring, having no taste, nor could I perceive any ochre about it, nor any silvery film on its surface. In the road to this spring stands a steep hill called *Brevikberget*, which I climbed with great difficulty. In the clefts of the rock lay several wings of young ravens and crows, with feet of hares, &c. "See," said I to my companion, "here has been the nest of an Eagle Owl!" On arriving at the next crag, a little higher up, we discovered a pair of birds of this species (*Strix Bubo*) sitting in a hollow of the rock. Their eyes sparkled like fire, for the iris in each of

them was luminous in itself, like touch-wood, glow-worms, or rotten fish. These birds were as large as young geese. I durst not venture to attack them with my hands; but approaching them with a stake, I then first perceived they were almost full grown, though not yet able to fly. The extent of their wings when spread was four feet; their colour blackish, with red-brown spots; their plumage very soft down, of a blackish hue tipped with white, mixed with sprouting quills. The smaller feathers were underneath of a reddish brown, marked with very narrow curved lines. The hue of the larger feathers, especially of the breast, where they were most apparent, was a brick colour, each being marked with a black indented longitudinal stripe. The feathers over the eyelids were small and black; upper part of the cheeks dark coloured, lower whitish. The wings and tail were not yet come to their full growth, but their quill feathers were blackish, with roundish red-brown spots. Feet like those

of a hare, red-brown and downy, with naked claws. Bill black, the cere or membrane at its base black, accompanied by whitish whiskers. Nostrils at the fore part of the cere, roundish, separated by an oblique partition. Throat white. Iris of the eye round, large, saffron-coloured, with a very large blueish-black pupil. The ears were large, and I could have wished they had fallen under the inspection of an able anatomist, as they would certainly have afforded him matter for curious observation. The bones called the *stapes*, *incus*, &c., as well as the *cochlea*, were of large proportions. The eyes also were large and prominent, dilated at their base like an onion. When the white outer coat was removed, which was easily accomplished, the cornea appeared of considerable thickness, in which, when in a room, external objects were very accurately delineated, but not so abroad. The crystalline lens was remarkably soft, and scarcely of more consistency than the vitreous humour. The

tunica arachnoidea was very conspicuous, filled with innumerable vessels, and of such firmness as to be very easily separable from the cornea. In the middle, near the optic nerve, it looked red from the number of blood-vessels, but the sides were of a blueish black. There were two orifices at the larger corner of the eye.

On this same mountain grew in abundance a kind of *Muscus lichenoides* of a greyish black colour, as if scorched or burnt, different from what authors have described, being more coriaceous and greenish, while that is black and brittle, almost like burnt paper, and smooth underneath; whereas the plant I here observed has the under side entirely covered with fibres like little roots. (This was the true *Lichen velleus* of Linnæus, preserved in his herbarium, and figured in Dillenius, *tab.* 82. *f.* 5. See *Fl. Lapp. ed.* 2. 360.)

The branches of Spruce Fir here began to show that appearance to which Clusius, if my memory does not deceive me, has

given the name of *Pinus nodosa*. These knots consist of innumerable little plates, looking as if all the buds had been cut short, and platted together. In the inside is lodged a great mass of very small oblong insects, or rather eggs.

June 17.

Although I walked about a good deal, and was not inattentive to what came in my way, I met with nothing peculiarly worthy of notice. On the grass I frequently observed that substance like saliva, which the common people call Frog-spittle, and which envelops a little pale flesh-coloured insect like a small Grasshopper. This insect, though not arrived at maturity, moved in some degree, and showed sufficient signs of the family to which it belonged, though it was not yet old enough to cut capers. I removed the frothy moisture from some of these insects, and on returning to them in the course of an hour, I found them covered as before; a proof

of the origin of the froth, which is produced by the animal for the purpose of protecting its tender skin against the violent heat of the sun.

Whilst I was busied in these observations, a number of cattle came running over the fields with the greatest velocity. Even the most miserably lean cows, which one would think scarcely able to drag one leg after another, went skipping along like does. *Hic pauper cornua sumit**. They twisted their tails round and round, and went bounding and frisking about, till they at length reached a puddle, where they stopped all at once, as having found a sure asylum against the enemy that had put them to flight. Anxious to investigate what it could be that excited such extraordinary agitation, and prompted such exertions as neither the whip nor the fear of immediate death could occasion, I discovered it to be an insect which I had already

* "Here the poor takes up horns." Alluding to Horace's "*addis cornua pauperi.*"

met with lower down in the country, and which is no other than an *Oestrus* or Gad-fly, (*Asilus crabroniformis*). Our Natural Historians confound the *Oestrus* with the *Tabanus*, which are as distinct from each other as a hare from a bear*. Cattle indeed are as much incommoded by the *Broms* (*Tabanus bovinus*) as by the very worst of the Fly or *Musca* tribe, to which the *Tabanus* certainly belongs; but by the *Oestrus* (*Asilus*) they are frightened out of

* By this comparison, and the subsequent allusion to an *Ichneumon* and a Hornet, Linnæus at the present period appears to have taken this *Asilus* for one of the hymenopterous order, and he even calls it an *Ichneumon* in *Act. Upsal. ann.* 1736, *p.* 29, *n.* 8. The history of its attacking the feet of cattle is given in the first edition of *Fauna Suecica*, 306, on the authority of the country people, but is omitted in the second, probably because Linnæus found he had been misinformed. My learned entomological friend the Rev. Mr. Kirby observes that the real *Oestrus Bovis* is, as has from all antiquity been believed, the cause of the above-described agitation in cattle, who escape it by running into cool damp places, which it dislikes to frequent.

their wits. This insect does not fix itself on the body of the animal, but on the feet, between the larger and smaller hoofs. As it scarcely ever flies higher above the earth than two or three spans, and in general not more than four or five inches, the cattle, when aware of it, run as fast as they can till they get their feet into water or marshy ground, in which situations they are free from danger. The habit of the insect is that of an *Ichneumon*, and it much resembles a Hornet, being of a yellowish colour, with a small sharp point at its tail curved forwards. See the figure and description of Frisch, and my own specimen.

June 18. Sunday.

The people brought me a peasant's daughter, a year and half old, who was deprived of sight, requesting me to say whether her complaint was a cataract. Finding the eyes well formed, without any unusual appearance, and quite free from

specks or clouds, I was rather inclined to say the child had a *gutta serena*, but was soon convinced that this could not be the case, as she evidently enjoyed being in the light near the window. But at the same time I remarked curious convulsive motions in the eyes, and that when the child was spoken to, and tried to look towards the speaker, they were turned upside down, so that only the white part became visible. She was born in this state. I inquired of the mother whether, when she was with child, she had seen any body turn their eyes in this manner. She replied that she was then in constant attendance on her mother, or mother-in-law, who was supposed to be dying, but afterwards recovered, and whose eyes were affected with similar convulsions. *Hinc illæ lachrymæ*; this was the cause of the infant's misfortune. I believe it was not originally blind, but that the focus was situated too much on one side of the eye-ball, so that vision was

impossible unless the eyes were placed in a particular position with respect to the rays of light, as is observable in persons that squint. The natural situation of the eyes in the subject before me was partly under the upper lid, so that only half the pupil was exposed, and this was sufficient for vision in one particular direction only. I know no remedy for such a misfortune, except perhaps glasses, cut in a peculiar manner for this express purpose, might help it. I recommended however that the child's cradle should be placed with the feet towards the window, so that she might, though not at first without inconvenience, gradually acquire a habit of turning her eyes downward in pursuit of the light; for by repeated efforts any thing becomes possible and easy. Bartholin's management of squint-eyed people is founded on the same principles.

After a violent storm of thunder with much rain, I went, about four in the afternoon, to the new town of Pithoea, and ex-

amined several gardens, in order to learn what plants are able to stand the severe winters of this inhospitable climate. Among them were the Burnet (*Poterium Sanguisorba*) and the Costmary (*Tanacetum Balsamita*). Some young oaks had been raised from acorns the preceding year, the greater part of which were killed by the winter frosts. A few of them only had put forth a fresh shoot just above the ground. The apple-trees were almost entirely destroyed.

June 19.

I set out very early in the morning on a sea voyage to explore the natural productions of the tract called Skargarden and the islands belonging to it. The water a mile out at sea was scarcely salt, on account of the numerous rivers which here discharge themselves into the bay. No plants worth notice were to be found, though I searched carefully every place likely to afford any. Near the beach, where the tide often rises

in winter ten or twelve fathoms, I observed an Alder thicket now white with little patches of *Trientalis* and *Mesomora* (*Trientalis europæa* and *Cornus suecica*), whose snowy blossoms were a great ornament to the shore. Ray therefore justly mentions* the latter plant as growing in maritime places in Sweden. Here likewise grew the Male and Female Lychnis (*L. dioica*), for the most part with red flowers, very rarely with white; as well as the *Gramen miliaceum* (*Milium effusum?*), and a Rush two feet high, with its sharp stem reaching a span above the panicle, which is lateral, and divided into three principal branches. Of this there was also a smaller variety. (This Rush must have been the *Juncus effusus*. See *Fl. Lapp. n.* 117.)

The people hereabouts talked much of mountains haunted by hobgoblins, particularly the hill called Svenberget, situated between new and old Pithoea; also of seas

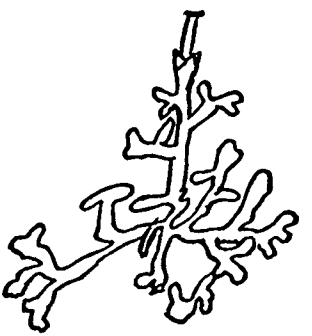
* See his *Historia Plantarum, v.* 1. 655, which Linnæus here correctly quotes from memory.

and fishing-places, where nothing is to be caught, unless by those who come unexpectedly. Their discourse moreover ran on that useful sort of witchcraft by which a thief is put to his wit's end and detected. The origin of these fables may partly be traced in history, and the rest is to be attributed to invention.

The fishes of this neighbourhood are the Crusian (*Cyprinus Carassius*), the Miller's Thumb (*Cottus Gobio*), the Bream (*Cyprinus Brama*), the Asp (*Cyprinus Aspius*) called in this part of Lapland *Kuroupek*, the Stäm (*Cyprinus Grislagine*), the Three-spined Stickleback (*Gasterosteus aculeatus*), the Laxäkel, a species of Trout (can this be the small or young Salmon, mentioned in *Fauna Succica n.* 345?), the Rud (*Cyprinus erythrophthalmus*), and the Holken (what this last is I know not).

In the island of Longoen, three miles from Old Pithoea, I was lucky enough to find, growing under a Spruce Fir, the Coral-rooted Orchis (*Ophrys corallorrhiza*, *Engl.*

Bot. t. 1547.) in full bloom, which had never fallen in my way before. It is a very rare plant, and grows so sparingly, that, after finding one specimen, there is little hope of soon meeting with another*.



The root is throughout of the thickness of a very small quill, white, smooth, fleshy,

* In the *Flora Lapponica* this plant is said to be very frequent in Lapland. In other countries it is usually reckoned extremely rare; but I was favoured by Mr. Edward John Maughan, a young botanist of Edinburgh, in the summer of 1807, with a copious supply of specimens and living roots, gathered amongst willows in a peat bog, a little to the south of Dalmahoy hill, about nine miles from Edinburgh. Some of the roots blossomed in my garden.

almost horizontal, branched and subdivided like a coral; the branches obtuse, and very slightly compressed, destitute of capillary fibres. Stem erect, simple, smooth, six inches high. Leaves none, except three sheaths, each longer and narrower than that below it, which reaches above its base, and all cylindrical, of a pale flesh-colour. Flowers generally about eight or ten, spreading in three rows, occupying an inch and half of the upper part of the stem; all equidistant, sessile, each with an acute scale at its base, cloven with an obtuse sinus. Germen oblong, striated, curved slightly outwards, but at length becoming erect and rugged. Calyx of three oblong, narrow, acute, purple-tipped, concave, equal leaves, longer than the petals, one of them being superior, the others inferior. Petals three: two of them ovate, adhering by their edges, constituting an upper lip; their summits reddish: the lowermost a flat, reflexed, obtuse, white lip, sprinkled with purplish dots near its base.

June 20.

This day I examined two nondescript species of fish, belonging to the genus *Cyprinus*. The first is called Stemma (*Cyprinus Grislagine*). Its head is oblong and obtuse, black on the top, silvery at the sides, and white beneath. The back of the fish is also blackish; its sides of a shining silvery hue; the belly white. Eyes round and white, their *irides* dotted, especially the upper part, which is moreover marked with a large verdigrise-green spot just above the black pupil. Nostrils round, accompanied with a pair of smaller roundish orifices. Mouth without teeth. Tongue blunt. Lower jaw a little the shortest; that part which covers the gills consisting of five connected, obtuse, not spinous, rays on each side. Dorsal fin solitary, of ten rays, the first of which is very short and undivided; the second twice as long, but likewise simple; each of the rest twice forked, except the tenth, which is only ob-

securely cloven. Tail forked, acute, of eighteen rays, one of which on each side is very long and simple, the others gradually shorter, twice forked, some of them still more subdivided. Anal fin of eleven rays, like those of the dorsal one, the external ones longest, as in that, both fins appearing forked when unexpanded. Ventral fins of nine rays each, one of them long and simple, the rest, as in the foregoing, gradually shorter, the last being cloven. These fins are not forked when unexpanded. Brachial (or pectoral) fins of seventeen rays like those of the foregoing, except that each is much shorter than its preceding neighbour, the ultimate one being scarcely discernible. Scales in seventeen rows on each side, including the dorsal and ventral rows in each reckoning, otherwise only fifteen. In the tenth row the lateral line is marked by a minute ovate-oblong dot on each scale of a silvery white, so that there are about fifty such dots on each side. The dorsal fin is blackish, the

rest pale, the ventral ones very slightly yellowish.

The whole length is two palms and five lines.

From the nose to the dorsal fin three inches.

Base of the dorsal fin eight lines; its length thirteen lines.

From that fin to the tail three inches and five lines.

Length of the tail one inch and four lines; its diameter at the base seven lines.

From each point to the fork ten lines.

From the tail fin to the anal one, one inch, two lines.

Base of the latter eight lines; its length eleven.

From the anal to the ventral fins one inch, five lines.

Base of the latter eight lines; their length eleven.

From the ventral to the pectoral fin one inch, eight lines.

Base of the latter four lines, length eleven.

Length of the head one inch, five lines.

Greatest diameter of the body one inch, five lines.

The other fish was a smaller *Cyprinus*, of a yellowish silvery hue, called at Pithoea *Wimba*. (*C. Wimba. Syst. Nat. ed.* 12. *v.* 1. 531). I could not perceive it to differ in any character from the preceding, except that it had sixty dots on each side, so that though a smaller fish it had more numerous dots and scales. The colour of the back was paler, and less black; the sides of a pale silvery hue. Ventral fins reddish at the outer and anterior edges, as is the lower edge of the tail.

Both these fishes differ from the Roach (*Cyprinus Rutilus*) in the colours of their eyes and fins, as well as in being thinner at the back.

June 21.

I took my leave of the old town of Pithoea, and arrived at the more modern

one of Lulea. All along by the road side I remarked the curious manner in which the Fir blossoms. Its branches produce a fresh shoot every year from their extremity; by observing the series of which shoots the age of the tree can be accurately computed. They retain their original leaves, which are needle-shaped, for three years; but when these fall the same branch never acquires any more. The male flowers, each of which is a *corymbus* of stamens, grow from the side of the present year's shoot, near its base; but the female ones proceed from the extreme point, and are round and red. Both kinds of flowers are however but seldom found on the same shoot.

In the Money-wort (*Linnæa borealis*), though its flower is, not without reason, reckoned by every body of the regular kind, its stamens indicate the contrary. They are four as in labiate flowers, two small, and two longer ones near the other side. Betwixt these the pistil is situated, being bent towards one side as in labiate

plants. The upper lip therefore is to be understood as consisting of two lobes, the lower of three, though all the lobes are alike*.

The bogs were now white with the tufts of both kinds of Cotton-grass, the upright and the pendulous (*Eriophorum vaginatum* and *polystachion*). The marshes were clothed with the white blossoms of *Ledum* (*palustre*). The Dwarf Bramble (*Rubus arcticus*) became gradually less abundant. The forests also were white with the *Trientalis* and *Mesomora* (*Cornus suecica*), which began to fade, and the Bilberry (*Vaccinium Myrtillus*) was taking their place, along with the *Melampyrum* (*sylvaticum*) and *Geranium* (*sylvaticum*). The meadows were perfectly yellow with the upright *Ranunculus* (*acris*), and some of the corn-fields were no less so with *Brassica campestris*; but where the *Behen* (*Silene in-*

* In this instance the Linnæan system led to a true knowledge of the natural affinity of the plant, which one founded on the corolla would scarcely have done,

flata, Fl. Brit.) was beginning to shoot forth, the former withered away. The rivulets were white with *Menyanthes* (*trifoliata*). The Cotton-grass and Willows now began to scatter their winged seeds.

DISTRICT OF LULEA.

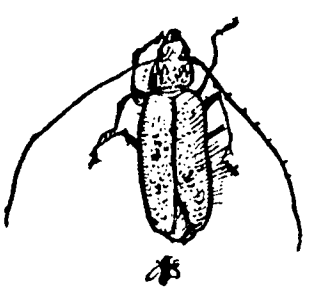
(Here follow, in the manuscript, sketches of the leaves, with Latin descriptions, of *Salix phylicifolia β, pentandra, caprea* and *myrtilloides*, to be found more complete in the *Flora Lapponica.*)

Close to the shore, on the right of the ferry of Gaddewick, is a considerable spring, named Kall Källa, or Cold Spring, having a strong current and abounding with ochre, which is deposited abundantly along its course. The water bears a silvery film, and has a mineral taste, though not a strong one. It gushes forth with impetuosity, and never freezes in its course to the river, which is about eighteen ells distant. No high hill is near, but it springs

from a swelling bank about two ells in perpendicular height above the level of the river. The mouth of the spring is towards the north-east. The inhabitants use it for washing.

In places near the highway, where the people had laid bridges, the soil appeared very thin. The gravel and sand were commonly about a span deep in moist places; in dry ones much more. The clay was often two ells in thickness, under which gravel again occurred. Between the dark-coloured sand and the clay, as well as where the clay terminated, especially near the sand, runs water, which deposits clay, as the above-mentioned spring does ochre.

I noticed the following insects.



1. A large black Capricorn Beetle, variegated with a lighter hue. (*Cerambyx Sutor*, the female.) The horns were longer than the body, black, consisting of ten joints, each joint ash-coloured at its base. Body black, rugged, its wing-cases besprinkled here and there with clustered dirty spots. Abdomen cylindrical, covered towards the thorax with beautiful red lice, (*Acarus coleoptratorum*).
2. A minute black fly, with a roundish body and white wings, (*Culex equinus*). This infested the horses in infinite multitudes, running under their mane, and attacking them with great fierceness, being not easily driven off. (See its figure subjoined to the former.)
3. A grey Gnat, with striated wings, a blackish body, and black legs surrounded with white rings. (Mentioned, in the *Fauna Suecica*, as a large variety of *Culex pipiens*, the Common Gnat.) This cruelly tormented me and my most miserable horse. Its wings are whitish,

appearing striated near the veins by the refraction of the sun's rays. The thorax was hairy, especially underneath. Abdomen oblong, dotted with black at the sides. All the other parts were grey. While the insect feeds, it raises up its hind feet into a horizontal posture. If I stooped ever so little whilst walking in the meadows, my nostrils and eyes were filled with these gnats.

June 22.

I gathered a shrubby Willow, with lanceolate downy leaves like those of *Elæagnus*. (This was *Salix arenaria*.) It is rather a large shrub, but rarely rises to the size of a tree. The leaves are furrowed along the course of the veins, and convex between them, slightly downy and of a greyish green on the upper side; clothed with snowy woolliness beneath. The lower scales of the bud nearly smooth above, and very green. Stem smooth, almost flesh-coloured, or pale brown; the young branches

reddish, clothed with white down. (See *Engl. Bot. v. 26. t. 1809.*)

Near the new town of Pithoea, close to the shore, grew the round-leaved Water Violet (*Viola palustris*) with perfectly snow-white flowers.

The Dwarf-cypress moss (*Lycopodium complanatum*) is rather plentiful hereabouts, and is used for dyeing yarn. For this purpose it is boiled with birch leaves, gathered at midsummer. It gives a yellow colour to woollen cloths. On the shore near old Lulea grew *Ranunculus minimus parisiensis* (*R. reptans*).

The new town of Lulea is very small, situated on a peninsula, encompassed by a kind of bay. The soil is extremely barren. Indeed the town stands on a little eminence, which is a mere heap of stones, with sea-sand in their interstices. It seems as if the sea had carried away all the earth, and, like a beast of prey, had left nothing but the bones, throwing sand over them to conceal its ravages.

I quitted this new town at one o'clock, there being nothing to be got; and as no horse was to be procured in the whole place, I proceeded by sea to old Lulea, half a mile distant. Here I met with a curious kind of grass, which in Smoland is called Kaffa skiægg, or Old-man's beard: at Pithoea its name is Svinborst, Hog's bristles: and at this place it is known by the denomination of Lapp-här, Lapland hair. (*Nardus stricta, Engl. Bot. t.* 290.) It was now in blossom. The root seems half bulbous, or as it were an aggregation of numerous bulbs. The leaves are bristly like a beard, and rough to the touch. The spike is unilateral, and scarcely thicker than the stem, composed of equally narrow alternate oblong scales.

The presence of this grass, as well as the whole aspect of the forests, marshes, cornfields, meadows, waters and herbage, evinced a great conformity betwixt this country and Smoland. Many herbaceous plants grow here which are not to be found

in Upland, Sudermannia, Ostro-gothia, nor Scania, though natives of Smoland.

In passing over a meadow towards the water-side I heard something snap and crackle in the marshes, as if the water had been boiling. In several places the latter was dried up, so that mud only remained, and these spots were almost entirely covered with a kind of shell-fish which made the above-mentioned noise. I observed the same in several similar places, but in others none were to be seen till I had stirred up the mud, when it proved full of these animals, which seemed to have made their way deeper and deeper into the soil as the water had withdrawn. The same sound may be observed in a thousand places, originally dry, when the water has access to them, but I had never ascertained the cause till now. (These shells seem to have been the *Mya arenaria*, *Faun. Suec. n.* 2127.)

The *Swammerdamia* flies of Swammerdam and Lister were flying about here, as numerous as atoms. I observed an in-

sect unknown to me, with a yellowish globular body the size of a lentil. Amongst the grass were thousands of the most minute species of Gnat, (*Culex pulicaris*,) the males being distinguished by their hairy foretops (*antennæ*).

The water swarmed with innumerable small fishes, just spawned, so pellucid that they were rendered conspicuous chiefly by their large eyes. The observer of nature sees, with admiration, that "the whole world is full of the glory of God."

This neighbourhood abounds with the *Stellaria minima* of botanists, (*Callitriche*,) generally supposed to be very rare. It is evidently no naturally distinct species, but a variety caused by circumstances. Every one knows that the common kind always floats in the water; whereas this *minima* never grows where water is actually present, but where it has been dried up in consequence of hot weather. Not being, therefore, able to sustain itself upright, it must creep, and becomes at the same time

diminutive from a deficiency of its usual aliment. If any one doubts this, let him place this dwarf plant in a rivulet, or the larger one in a situation from which the water is retiring, and the result will remove every doubt.

The inhabitants here are frequently afflicted with the scurvy, whence arise ulcers of the mouth and *uvula*, ulcerous sores and swelling of the feet, as well as aching pains in the legs and feet, and dropsical swellings of the latter. It may be expected that the peasants will be most liable to these latter diseases on festival days*.

June 23.

I went to see the old church of Lulea. Close by the door I was shown a hole which the monks had formerly caused to

* Linnæus perhaps means, that they may have a pretence to avoid the drudgery of going to church, through some of the hardships he has already described; yet here the church seems to have been near at hand, and in itself not unentertaining.

be made in the stone wall. It was perfectly circular, sixteen lines in diameter, and terminated in an obtuse oval cavity. It was intended as a measure to decide in some cases occasionally brought before the ecclesiastical court. Within the church is a magnificent altar-piece, adorned with old statues of martyrs, in the heads of which are cavities to hold water, with outlets at the eyes, so that these figures could, at the pleasure of the priests, be made to weep. There are two pedestals, with an image upon each, whose hands are so contrived that, by means of a cord, they could be lifted up in adoration, as the people passed by them in entering the church*.

* In Tuneld's Geography, I am told, is the following account of this church: "The parish church of Lulea is regarded as the oldest in Westbothnia, having been built in the very earliest ages of Christianity, and was very famous while the catholic religion prevailed in Sweden. It contains a remarkable old altar-piece, the gilding of which cost 2108 ducats. In the vestry a copy of the canonical law, in seven volumes folio, is still preserved."

A quarter of a mile to the north of the town is a mineral well, the water of which the dean and some other persons had used medicinally. The dean, who was gouty, had, in consequence of drinking this water, formed some chalk-stones. The well is situated in a steep mossy and marshy bank. Its water throws up sand as it rises, looks clear, ferments in a glass, with an iridescent appearance in the sunshine. It has a slight taste of vitriol, but is smooth in drinking. When shaken, it emitted a smell like that of gun-powder. A solution of galls turned it reddish, but the mixture did not stain white paper. Blue paper is not affected by this water. It deposits a great quantity of ochre, and the surface bears a silvery film.

This day and the two preceding, indeed every day since the 18th, had been bright, warm, and for the most part calm. The meadows were still fine and beautiful in their aspect, and every thing conspired to favour the health and pleasure of the be-

holder. If the summer be indeed shorter here than in any other part of the world, it must be allowed, at the same time, to be no where more delightful. I was never in my life in better health than at present.

The meadows in this neighbourhood abound with an arborescent willow, whose leaves are like those of an *Alaternus*, or a laurel. (*Salix phylicifolia*, *Engl. Bot.* *t.* 1958. *Fl. Lapp.* *n.* 351. *t.* 8. *f.* d). It is remarkable for the undulations, or flexures, between the serratures of the leaf.

The use of milk among the inhabitants of Westbothnia is very great; and the following are the various forms in which it serves them for food:

1. Fresh, of which a great deal is taken in the course of the day.
2. Fresh boiled.
3. Fresh boiled, and coagulated with beer, which is called *ölost*.
4. Sour milk, deprived of its cream, and capable of being cut.
5. Sour milk eaten with its cream.

6. Butter, made, as usual, of cream shaken till its oily part separates and floats.
7. Butter-milk, what remains after the butter is made.
8. Cheese, made of fresh milk heated, coagulated with calves' rennet, then deprived of its whey and dried.
9. This whey being boiled, the scum which rises is repeatedly collected, and called *walle*.
10. The remaining whey is used instead of milk or water in making bread.
11. The same fluid kept for a long time till it becomes viscid, is preserved through the winter, and called *syra*.
12. The whey of cheese boiled to a thick consistence is denominated *mesosmör*, and with meal is added to the preceding. See *p.* 197.
13. *Sötost*, or Sweet Cheese, is made of fresh milk boiled till it is partly wasted, and the remainder, of the thickness of pap or gruel, is eaten fresh.
14. *Mjölost*, Meal Cheese, is milk coagu-

lated with rennet, mixed with meal, and boiled.

15. *Tatmjölk*, is fresh milk poured on leaves of Butterwort, *Pinguicula*, as already mentioned, *p.* 196, 197.

16. Servet milk. See *Aug.* 10.

17. *Gös-mjölk*. See *Aug.* 10.

18. *Lapmjölk*, is milk mixed with sorrel leaves, (*R. Acetosa*,) and preserved till winter in the stomach of a reindeer, or some other animal.

19. The milk of the reindeer is placed in a cellar to prevent its quickly turning sour, in order to obtain the more cream; if it freezes, they thaw it again.

June 24.

Midsummer day. Blessed be the Lord for the beauty of summer and of spring, and for what is here in greater perfection than almost any where else in the world,—the air, the water, the verdure of the herbage, and the song of birds!

I walked out in the morning to botanize, but met with nothing curious, except *Arisarum* of Rivinus (*Calla palustris*), the flower of which is described in my *Characteres Generici*; and the *Corallorrhiza*.

Here I was first informed of a disease which had made great ravages amongst the cattle in this neighbourhood, and which was of so pestilential a nature, that, though the animals were flayed even before they were cold, wherever their blood had come in contact with the human body, it had caused gangrenous spots and sores. Some persons had had both their hands swelled, and one his face, in consequence of the blood coming upon it. Many people had lost their lives by it, insomuch that nobody would now venture to flay any more of the cattle, but they contrived to bury them whole. As a preventative they had adopted the practice of swimming their cattle once a day, which they believed rendered the animals proof against the disorder.

I was told that the cattle grazing on a

certain declivity at Tornoea die to the number of two or three hundred in the course of the summer. I must examine whether the cause of this may not be the Water Hemlock (*Cicuta aquatica*).

. Could not meadows be freed from their wart-like tumps by burning? These swellings might be cut off with an oblique hatchet, in spring after the frost ceases, and burnt in a heap; their ashes would serve as a valuable manure for the corn-field. Sandy grounds are rendered fertile with bog-earth; clay with sand. *Ledum* (*palustre*) is laid among corn in the barns, to drive away mice.

I here obtained some of Nasaphiel's silver ore, and the curious iron ore of Lulean Lapmark, called *gubbsilfver* (old man's silver). The mine is not yet exhausted. The working of it had been for some time discontinued, but it is now resumed. It yields sixty per cent. It is situated a mile distant from Jockmock, and is called Rutawari. I procured also from the pa-

rish of Pithoea some pencil lead, or lead-like *mica* (black lead) which blackens the fingers.

The weather continued extremely fine, which in the opinion of the common people portended a good harvest.

June 25.

Sunday.—After divine service, I took leave of Lulea, in order to proceed to Lulean Lapmark, and arrived at the river of Lulea. I was informed that the salmon, which remain all winter in the Western Ocean, proceed gradually, as spring advances, up the river to this place to spawn. They enter the river about the middle of May, and reach this part of it by midsummer. Hooks have been found sticking in the side of some of the fish, which proved their having been here before.

The *Subularia*, a new *Melampyrum**, and *Pedicularis* (*sylvatica*) with a white

* What this was does not appear. *M. pratense* and *sylvaticum* only have been found in Lapland.

flower, occurred to me at Sunnerby. The white bog-moss (*Sphagnum palustre*) powdered, is applied to excoriations in the skin of young children. Towards evening I found in a sand-hill a loose kind of sandstone containing three per cent of iron.

June 26.

I gathered *Gramen paleaceum* (*Juncus bufonius*), both kinds of *Tetrahit* (*Galeopsis Tetrahit* and *G. versicolor*, *Fl. Brit.*), *Geranium* (*sylvaticum*) with a pale white flower. At Bredacker I noticed the *Conyza* (*Erigeron uniflorum* or *E. acre*), the purple-flowered Millefoil (*Achillea Millefolium*), and the *Cirsium* (*Carduus heterophyllus.*)

The Laplanders boil all their meat very thoroughly, and treat their guests with grease, by way of dainty, which is eaten with a spoon. They milk their reindeer twice a day. Each gives not more at a time than half a pint, or at the utmost three quarters.

The natives of the country tan their leather with birch bark, buying hides of the colonists for this purpose. The hides, after being plunged into warm water, are buried in some out-of-the-way corner of the hut, and taken up every day till the hair begins to separate, which is then scraped off with a roundish knife. The recent inner bark of the birch, cut into small pieces, is then boiled in common water for half an hour; in which liquor, when partly cooled, the skin is immersed. On the two following days it is taken out, the liquor warmed, and the skin replaced. Afterwards it is dried in the open air in the shade. This leather is much better and softer than what the colonists themselves prepare, but these last-mentioned people are very tenacious of their own modes and customs.

Near the margin of the river various species of Willow, which I had already gathered and described, were growing in high beauty, and contributed greatly to the ornament of its banks. The neigh-

bouring forests consist of pine trees intermixed with birch, but the latter tree is much less abundant here than in Umoean Lapmark, especially in Siodorne. Leaves of the Meal-berry (*Arbutus Uva-ursi*) are used in tanning or dyeing; which saves a great deal of alum. Many barrels of these leaves are sent for sale to Stockholm.

The Laplanders of Westbothnia give their young children the unripe berries of this shrub boiled, by way of a laxative or purge. Ten or twelve are the usual quantity, but the dose varies according to the age of the patient.

Several kinds of Foxes are found in Lapmark. Their fur is more valuable in proportion as they come further north.

1. The black is the dearest of all. From sixty to two hundred dollars of copper money are paid for one of these skins. People of rank in Russia use them for hoods or head-dresses. All their counsellors have caps of black foxes skin.

2. The rusty-coloured kind, with grey legs, sells for sixty dollars.
3. The cross foxes skins, black over the shoulders, loins and backbone, sell for three or four plates (rather more than as many shillings sterling).
4. Blue foxes are worth from six to ten dollars.
5. Red foxes, which are of a yellowish hue, and
6. White ones, fetch but three dollars each.

The Sting-gnat (*Culex pulicaris*) is a very minute insect, much the smallest of its genus, being about the size of a large flea, of a greyish or clouded white. Its sting is very severe, and leaves a blackish spot as large as that caused by a flea-bite. The wings of this species lie one over the other, as in (*C. reptans*) the kind already mentioned, *p.* 209.

In this part of the country, as in Umoean Lapmark, are many elevated fields of barren sand adjoining to the river, and sloping towards it, each of them divided

into quarters by transverse ditches. The river has washed away one of its banks so far as to form a perpendicular cliff, exhibiting *strata* of light-coloured barren sand, which must be supposed to have been deposited there by water, as they lie horizontally. The neighbouring alps must have been the original boundaries of the current, till the quantity of water decreased. Then the large river shaped out its course, leaving several smaller channels, intersecting what is now the adjacent plain, with islands between them.

Half way between Svarlå and Harns I met with the (*Pedicularis*) *Sceptrum Carolinum*, first observed by Professor Rudbeck. This stately plant was not yet in flower. It grew in a dry soil. In the neighbouring watery places grew a new species of Marsh *Ranunculus*, (*R. lapponicus*,) having a calyx of three pale reflexed leaves, five or six narrow acute rue-like yellow petals, more upright than usual, their claws each furnished with a scale. Stamens nine to

twelve. Pistils six to twelve. Leaves commonly two to one stem.

June 27.

Near Harns is found a fine handsome blue clay, in some measure fire-proof; also a rare kind of iron ore.

The corn-fields here produce *Echioides* (*Lycopsis arvensis*), and the woods the most slender kind of *Equisetum* (*sylvaticum*). On the river's bank near Laxeden grew the Sorrel whose leaf is cut away in the middle, called *Acetosa folio in medio deliquium patiente*, (*Rumex digynus*,) but it was not now in flower.

On the other side of the river stands a Pine tree marked with the yearly elevation of the water, as well as its greatest decrease. In 1669 it rose eight feet perpendicular more than the present year, and in 1667 it rose still one foot higher; but since that time it has every year fallen more and more short of such an elevation. Not far distant is a mineral spring, which

of all that I have met with deposits the greatest quantity of ochre. Its taste is highly astringent. Some persons have drunk the water medicinally, not altogether without benefit.

Near the river I noticed the *Pinguicula*, and every where hereabouts the Least Cotton-rush (*Eriophorum alpinum*).

The people here, who dread their children should be marked with that kind of spot called *Eldmarke*, which resembles a burn, as soon as the umbilical cord is cut, rub some of its blood upon the face, hands and breast of the infant, by way of prevention.

I was here told of a specific to destroy House Crickets (*Gryllus domesticus*), which consists of grated carrots mixed with arsenic. This they eat greedily, and are all infallibly poisoned.

We passed the night in a large sailing-boat upon the river, in which we had performed the chief part of this day's expedition.

June 28.

In the morning we continued our voyage to Storbacken a mile and half distant, from whence we were afterwards obliged to walk five miles to Jockmock. This day indeed we only reached Pajarim*, where we slept all night in a smoky hut, ventilated merely by holes in the roof.

I found in the woods the (*Erysimum*) *Barbarea*, with a stem four feet high, but its leaves were neither so broad, nor so much auricled, as in the garden plant. Crooked pine trees were to be seen in several places, the under side of which is always as hard as box-wood, and this part is used for naves of wheels and the bottoms of sledges. Such wood is called *kior*.

* The author in his *Flora Lapponica*, *n.* 13, mentions having found his *Pinguicula villosa* growing among Bog-moss, *Sphagnum*, near this place, and in no other. This plant is not noticed in the manuscript Tour.

LULEAN LAPLAND.

NEAR Storbacken, at the confluence of the great and small rivers of Lulea, is the boundary mark between Lapmark and Westbothnia.

As soon as I entered Lapmark, the hill which forms a promontory betwixt the two rivers afforded me the following plants.

The Sorrel lately mentioned (*Rumex digynus*) was here in blossom. The calyx is of two leaves; the petals two, perfectly like the calyx. Stamens six. Pistils two, in the same flower with the stamens, reflexed. Fruit compressed, with two, not three, angles. Some of its flowers were infected with smut, as in barley.

The Small Liquorice (*Astragalus alpinus*, see *p.* 159). Some plants had white flowers, tipped with a blueish hue; the others bore entirely purple blossoms.

On the hill named Wollerim I met with a very rare little species of Asphodel, with

white flowers in a roundish spike (*Antheri-cum calyculatum*, *Sp. Pl. Tofieldia palustris*, *Engl. Bot. t.* 536). The leaves are ranged on each other's back (equitant) as in the Marsh Asphodel (*Narthecium ossifragum*, *t.* 535). At a small distance in the marshes I found the small flowering rush of Bauhin, *Juncoidi affinis* of Scheuchzer, (*Scheuchzeria palustris*). The calyx is of six oblong sharpish leaves, reflexed and permanent. Petals none. Stamens six, capillary, very short, pendulous, with upright, very long, obtuse, compressed *apices* (anthers). Embryos (germens) three, often four, rarely five, ovate, compressed. Pistils (styles) none. Stigmas attached to the outer part of the embryos, not elevated. Capsules of two valves, with one seed in each capsule. Leaves concave, sheathing the lower part of the stem.

In the evening I observed Red Currants (*Ribes rubrum*), and a kind of panicled grass with blue leaves, (perhaps an *Aira*, but it cannot now be determined).

Here was the black biting spider (*Aranea palustris*), but not the *littoralis* (*A. riparia*).

June 29.

The Pine trees are observed to be more barren of branches on their north sides; hence the common people know by these trees which way the north lies. The timber lay here in abundance, entirely useless. Brandy is made from the fir, as well as from the berries of mountain ash.

About a mile from Pajarim I came to the mountain of Koskesvari, which is very lofty, insomuch that the snowy summits of the Lapland alps are visible from it, though at a very great distance. In this elevated situation the Red Whortle-berry (*Vaccinium Vitis idæa*) assumes a quite different appearance from what is usual, its stems being twice as long, perfectly erect, and not branched. The extremities of the branches of the Spruce-fir bear small yellow cones, which however are nothing else

than the leaves deformed, being thicker and shorter than when in their proper state, and of a pale yellow, marked on their inside with two prominent orange-coloured lines. When arrived at maturity, they burst asunder, and discharge an orange-coloured powder, which stains the clothes of those who approach the tree. I conceive these excrescences to be caused by some minute insects. The common people eat them raw as a dainty, like berries. Here also I met with a narrow-leaved *Cirsium* (*Serratula alpina*), which I had previously noticed in Umoean Lapmark, but it was not then in bloom. Likewise (*Rhamnus*) *Frangula*, *Pinguicula*, Unbranched Quaking-grass (this must have been *Melica nutans*), *Corallorrhiza*, the Narrow-leaved Spotted *Orchis* (*maculata*), *Geranium* (*sylvaticum*) with a white flower veined with purple, a purple pistil and blue anthers. The leaves of this last plant were variously divided, the lower in seven lobes, the middle ones in five, the uppermost opposite

and sessile, with only three lobes. Two flowers grow on each stalk.

Here also I gathered a *Pinguicula*, the fore-part of whose petal was white, the hind-part blue, which is certainly a beautiful as well as singular variety. (See *Fl. Lapp. n.* 11. *P. vulgaris.*)

The trees here produce *Usnea arborea* (*Lichen plicatus*), which the Laplanders apply to excoriations of the feet caused by excessive walking. They line their shoes with this moss, a practice which might with advantage be adopted by soldiers on a march. The Laplanders also line their shoes with grass, consisting of various species of *Carex*, (especially *C. sylvatica*, *Fl. Brit.*). This grass they comb with iron or horn combs, bruising it between their hands till it becomes soft and pliable. When dried they cram it into their shoes, and it answers instead of stockings for defending the feet from cold. (See *Fl. Lapp. n.* 328.)

After much trouble and fatigue, I at length reached Jockmock, where stands

the principal church of this northern district, and where its pastor resides.

June 30.

The clergyman of Jockmock, Mr. Malming, who is the schoolmaster, and Mr. Högling the curate, tormented me with their consummate and most pertinacious ignorance. I could not but wonder how so much pride and ambition, such scandalous want of information, with such incorrigible stupidity, could exist in persons of their profession, who are commonly expected to be men of knowledge; yet any school-boy twelve years of age might be better informed. No man will deny the propriety of such people as these, at least, being placed as far as possible from civilized society.

The learned curate began his conversation with remarks on the clouds in this country, setting forth how they strike the mountains as they pass, carrying away stones, trees and cattle. I ventured to

suggest that such accidents were rather to be attributed to the force of the wind, for that the clouds could not of themselves lift, or carry away, any thing. He laughed at me, saying surely I had never seen any clouds. For my part, it seemed to me that he could have never been any where but in the clouds. I replied, that whenever the weather is foggy I walk in clouds, and when the fog is condensed, and no longer supported in the air, it immediately rains beneath my feet. At all such reasoning, being above his comprehension, he only laughed with a sardonic smile. Still less was he satisfied with my explanation how watery bubbles may be lifted up into the air, as he told me the clouds were solid bodies. On my denying this, he reinforced his assertion with a text of scripture, silencing me by authority, and then laughing at my ignorance. He next condescended to inform me that after rain a phlegm is always to be found on the mountains, where the clouds have touched them. Upon my

replying that this phlegm is a vegetable called *Nostoc*, I was, like St. Paul, judged to be mad, and that too much learning had turned my brain. This philosopher, who was as fully persuaded of his own complete knowledge of nature, as Sturmius was of being able to fly by means of hollow globes, was pleased to be very facetious at my expense. At length he graciously advised me to pay some regard to the opinions of people skilled in these abstruse matters, and not, at my return home, to expose myself by publishing such absurd and preposterous opinions as I had now advanced.

The other, the pedagogue, lamented that people should bestow so much attention upon temporal vanities, and consequently, alas! neglect their spiritual good*; and he remarked that many a man had been ruined by too great application to study.

* I have known one instance of such bigotry, or rather hypocrisy, out of Lapland.

Both these wise men concurred in one thing. They could not conceal their wonder that the Royal Academy should expressly have appointed a mere student for the purposes for which I was sent, without considering that there were already as competent men resident in the country, who would have undertaken the business. They declared they would either of them have been ready to accept of the charge. In my opinion, however, they would but have exhibited a fresh illustration of the proverb of the ass and the lyre.

The number of pupils under the care of the gentleman above mentioned at this time amounted to four only. The church is but a small one.

It is a practice here with some persons who have the headache, from excessive drinking or any other cause, to hold their foreheads before the fire till they smart violently. Others apply to the temples young shoots of spruce fir bruised.

Half a mile from the church I gathered

the *Cirsium minus* (*Serratula alpina*), the *Cacalia* (*Tussilago frigida*), the latter not in flower, and one kind of Botsko of the Laplanders, called Biœrnstut in Westbothnia (*Angelica sylvestris*), which is the narrow-leaved species of *Angelica*, and resembles the larger kind. Its general umbel is destitute of an involucrum. My Lapland companion seized it immediately, and peeling the stalk, which had not yet flowered, ate it like a turnip, as a great delicacy. Indeed it tasted not unpleasantly, especially the upper part, which is the most tender. This dainty is in great request amongst the Laplanders.

We arrived at length at Purkijau, a small island, the northern side of which is planted with forests of spruce fir, and the others with woods of birch, by way of protection to the corn. The colonist who resides here informed me that the corn never suffered from cold, as, besides the shelter afforded by these plantations, the circumjacent water moderated the degree of frost. The

situation of this island is pleasant. I found in some bushy parts of it the *Sceptrum Carolinum*, and another species of *Pedicularis*, with narrow leaves and a tuft of purple flowers (this seems to have been *P. sylvatica* only).

The river Karax, where is a pearl fishery, runs not far from hence. On its banks I remarked the *Sceptrum Carolinum*, which became very common as I advanced further on my journey.

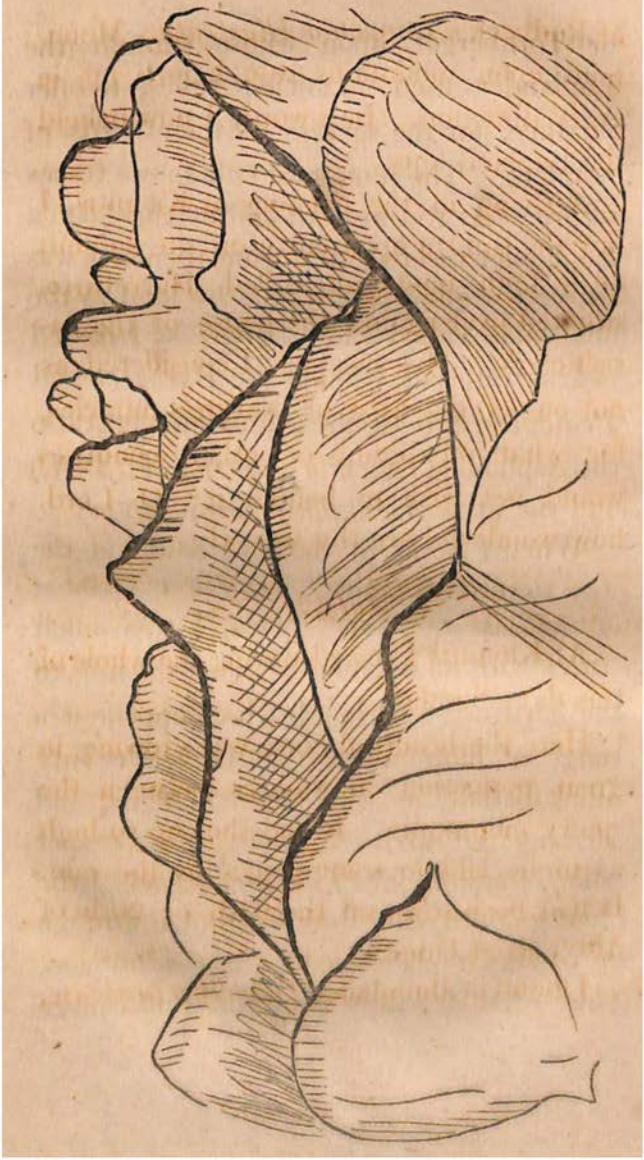
Another mile brought us to the lake of Randiau; on approaching which we saw nothing before us but lofty mountains of an oblong obtuse form, lifting their summits one above another, and on the most distant of these snow was to be seen, though half melted away like snow in the spring.

July 1.

Parkajaur, the first lake I reached after leaving the place where I slept, is a short mile in length. At its opposite shore rises the lofty peaked mountain of Achiekoivi,

or Tornberget, upon whose summit the Laplanders used, in ancient times, to offer sacrifice, for the success of their herds of reindeer. The mountain still shows traces of fire. At the western end of this lake a Laplander resided, and from thence it was scarcely a quarter of a mile by land to the next lake, called Skalk, where as I passed near a waterfall, I found the *Barbarea* and *Pedicularis*, both already mentioned, also the Asphodel (*Tofieldia palustris*, *Fl. Brit.*) and the little *Astragalus*, see *p.* 159.

When I came to the lake Skalk in the way towards Kiomitis, about a mile short of the last-mentioned place, I was much struck with an opening between the hills to the north-west, through which appeared a range of mountains, from ten to twenty miles distant, as white as the clouds, and seeming not above a mile from the spot where I stood. Their summits reached the clouds, and indeed they resembled a range of white clouds rising from the horizon. They recalled to my mind the frontispiece



of Rudbeck's *Lapponia Illustrata*. Mountains upon mountains rose before me in every direction. In a word, I now beheld the Lapland alps.

Arriving in the evening at Kiomitis, I saw the sun set apparently on the summit of a high mountain called Harrevarto, situated over against the house of the parish clerk. This spectacle I considered as not one of the least of Nature's miracles, for what inhabitant of other countries would not wish to behold it? O Lord, how wonderful are thy works!

July 2.

At Kiomitis I rested during the whole of this day, Sunday.

Here the beautiful corn was growing in great perfection in valleys between the snowy mountains. It had shot up so high as to be laid in some places by the rain. It had been sown on the 25th or 26th of May, as at Umoea.

I found in abundance *Tripolium pratense*,

coronâ calyce breviori, or *Aster folio non acri, flore purpureo*; (*Erigeron uniflorum*, *Fl. Lapp. n.* 307. *t.* 9. *f.* 3.) The same occurred with a white flower. Also *Euphrasia* (*officinalis*) about its usual size, but with very small flowers; (a variety mentioned in the *Flora Lapponica*, *n.* 247, found likewise in Switzerland.) In the same neighbourhood grew the *Tetrahit*, both with small and large flowers, (*Galeopsis Tetrahit*, and *G. versicolor*, *Fl. Brit.*)

July 3.

Early this morning I went with Mr. Joachim Koch, quarter-master of the regiment stationed here, and Mr. Segar Swanberg, master of the mines, to the Kiuriwari, a high mountain half a mile from Kiomitis, where a silver mine had just been opened. The ore showed itself only in one cleft, whose sides it seemed to cement together.

All over this mountain I observed a kind of *Uva Ursi* with black fruit, which I do not know that any author has described.

The flower was exactly like that of the Mealy-berry (*Arbutus Uva-ursi*); each stood on a simple stalk, and had five teeth at its orifice. The fruit was of five cells, globose, enclosed in the petal. (*Arbutus alpina.*)

I likewise found here a Catch-fly with ten stamens and five styles (*Lychnis alpina*), exactly similar to the common Catch-fly (*Lychnis Viscaria*), except that the flowers were smaller and not so much scattered, neither was the stem at all viscid.

Birch trees were to be found even on the highest part of this hill, but of a very diminutive stature. Their trunks were thick but low, and their highest shoots seemed to have been killed by frost, so that the young leaves looked as if they were growing out of branches that had been burnt. I was told that these trees afford every year but a very small portion of sap, and that the wood is much harder than the common kind. Such diminutive trees grow to a

great age. The further I proceeded up the country, the smaller I still found them.

Some of the people hereabouts clean their half-boots and harness with the fat of fish; others purchase blacking from Norway.

July 4.

I met with an *Andromeda* with leaves like *Empetrum* (*A. cærulea*). The stem and foliage were exactly like that plant, but somewhat larger. The calyx rough, short, with five teeth. Corolla of one petal, blue, ovate, with five spreading notched segments at its orifice. Stamens ten, very short, with horned anthers. Pistil one, the length of the corolla, with a blunt pentagonal stigma.

The following food is prepared by the Laplanders from milk.

The *messen* or whey, after the cheese is made, is boiled to a thick consistence, and a small quantity of cream from the milk of

the reindeer is added. The whole is afterwards dried in the maw or rennet-bag of the reindeer, and tastes very well.

Kappa is the scum which rises while the whey is boiling. This being skimmed off, is also kept in rennet-bags for use.

The milk is not turned, in order to make cheese, with rennet, but with the maws of pike (*Esox Lucius*), of charr (*Salmo alpinus*), or of the grayling (*Salmo Thymallus*). These are previously dried, and preserved for use in a little keg of milk. When any of this is taken out for use, they are careful to fill up the vessel with fresh milk, that they may always have a supply at hand.

Jumomjölk is prepared by boiling half a pint of *syra* (see *p.* 243) in a small quantity of water, which must be kept stirring till the whole is perfectly dissolved. It is then mixed with milk of the reindeer, and poured either into rennet-bags of that animal, or some kind of pot or tub, in

which it is preserved for future use, if not immediately eaten.

Rennet is also made by taking the maws of such reindeer fawns as die in the spring, putting milk into them, and hanging it up to dry for use.

I here made the following observations relative to the remedies used by the Laplanders.

Their *Moxa*, as the Japanese call it, but which they term *Toule*, is made of a fine fungus found on the birch, and always chosen from the south side of the tree. Of this they apply a piece as large as a pea, upon the afflicted part, setting fire to it with a twig of birch, and letting it burn gradually away. This is repeated two or three times. It produces a sore that will often keep open for six months afterwards, nor must it be closed till it heals spontaneously. This remedy is used for all aches and pains; as the headache, toothache, pleurisy, pain in the stomach, lumbago, &c. It is the

universal medicine of the Laplanders, and may be called their little physician.

Kattie is a kind of drawing or ripening plaister made in the following manner. The fine loose scaly bark of birch is set on fire, and immediately quenched in water. It is then chewed, in the same manner as when wanted for cementing earthen-ware together, and afterwards mixed with fresh turpentine from the spruce fir, both being kneaded together by the hands, till the mass becomes a black uniform plaister. This has a very emollient quality, and is successfully applied to hard imposthumes, &c., which it brings to maturity without pain in a short time, and promotes their discharge.

The common method of the Laplanders for joining broken earthen-ware, is to tie the fragments together with a thread, and boil the whole in fresh milk, by which they are cemented to each other.

The grass used for lining shoes is a *Carex*

pseudo-cyperus, with many slender pendulous spikes. (*Carex sylvatica*, *Fl. Brit.*)

An ointment for burns is made of fresh cream boiled to a thick consistence, with which the sore is anointed. It removes the pain, and admirably promotes the healing of the ulcer.

For chilblains, the oil or fat which exudes from toasted reindeer cheese, rubbed upon the part affected, is a sovereign cure. Some persons use dog's fat for the same purpose. The latter is also used for pains in the back, being rubbed in before a fire.

The Laplanders make use of no razor, but cut their beards with scissars. They never cut the hair of the head, and only occasionally employ a comb or any similar instrument. They have no laundress or washerwoman.

The drug called castor is one of their great remedies for every disease, and the gall of the bear is another.

When a wedding is to be celebrated, the

lover takes all his relations along with him, each carrying meat and brandy. Being arrived at—(this sentence is left unfinished in the manuscript.)

July 5.

I continued my journey to Hyttan, and in my way passed a marshy place, such as the Laplanders call *murki*. Close to the borders of it grew the least *Thalictrum* (*T. alpinum*), with four pale petals, and twelve stamens with long anthers, their filaments purple. In another part grew an *Androsace* with two drooping flowers. It had five stamens; one capitate pistil; an ovate fruit of one cell; a five-cleft calyx, and a swelling (corolla of one) petal. It is therefore not a good *Androsace*. (This was unquestionably *Primula integrifolia*, see *Fl. Lapp. ed.* 2. 52, which Linnæus, in that work, seems to have confounded with *P. farinosa*. Speaking of the latter he says, "This *Primula*, the splendid crimson of whose flowers attracts the eyes of all who

traverse the fields of Scania and the meadows of Upland in the early spring, did not occur during my whole journey till after I had ascended the Lapland Alps, where it grew very sparingly, furnished with only two or three flowers, and those of a very pale hue, so that in the mountains of Lapland it deserves neither the name of Cæsar nor of Regulus*. The stem of the plant, however, in these regions was a span or more in height, which is hardly the case in any other part of Sweden." *Fl. Lapp. ed.* 2. 51. Hence it appears that the real *P. farinosa* ought to be struck out of the Lapland Flora, provided no botanist has found it there since Linnæus made the above remarks.)

Sceptrum Carolinum was in blossom near the water, as well as the gloomy *Aconitum* (*lycoctonum*), "whose flowers with us are not yellow, as the synonyms of

* See Simler, who calls the *Primula farinosa* "Cæsar or Regulus among herbs."

authors assert, but every where of a blueish ash-colour*."

Here also grew *Juncus palustris, calamo trifido* (*J. trifidus*); the Violet with a yellow flower (*Viola biflora*); and the Wood Stitchwort with heart-shaped leaves (*Stellaria nemorum*, which Linnæus, in Flora Lapp. n. 186, confounds with his *Alsine media*, or *Stellaria media*, *Fl. Brit.* a mistake he corrected in his *Species Plantarum*).

Shortly afterwards I came within sight of an oblong and very lofty mountain, situated on the right-hand, called Carsavari, composed of a coarse kind of fissile stone, upon which pure native alum is found; see Bromell (in the *Acta Suecica* from the year 1726 to 1730).

Very near the last-mentioned mountain is situated another, called Tavevari, remarkable for two rivulets running down

* This remark of Linnæus I have borrowed from Fl. Lapp. n. 221.

from its summit, and falling over a rock in the middle of their course.

Concerning the spots or imperfections in the skins of reindeer, it is certain that they originate in the perforations made by insects, probably a species of *Tabanus*, through which those insects introduce their eggs. When the young ones arrive at maturity, they come forth by the same passage, and the wound is closed by a scar. On this subject, lest any person should be misled by authority, or by the writings or reports of others, I shall quote the learned work of Linder on *Syphilis*, *p.* 11. "Reindeer in Lapland are subject to the small-pox, which in Norland is termed Kormsiuka, as I was informed at Wicksbergensbrun by Zachary Plantin, master of arts." In this the able writer has been totally misled, by a person usually esteemed no less honest than profoundly learned. I cannot however conceive how a man, who values himself upon such a character, should willingly and deliberately propagate a false-

hood. He ought, on the contrary, rather to aim at correcting it. If the reindeer should even have the small-pox every year, this supposed disease will prove on examination nothing else than the sting of the Gad-fly (*Oestrus Tarandi*). Did any man ever advance such an absurdity! Even the Laplanders themselves call the disease *Kurbma* (which is the name of the fly that actually causes it).

One of the Laplanders' dishes, called *Kappi*, or *Kappa-tialmas*, is prepared in the following manner. While the milk of the reindeer, intended for making cheese, is warm, before the rennet is added to it, a film rises to the top, which is taken off carefully with a spoon, and put into the bladder of a reindeer. This is hung up against the side of the hut to dry; after which it is eaten, being esteemed a great delicacy. They frequently mix some kind of berries with it when used. The fruit called *Iljortron*, (Cloud-berry, or *Rubus Chamæmorus*,) bruised and eaten with milk

of the reindeer, is also a very palatable Lapland dish. The milk of this animal affords at least twice as much cheese in proportion as any other milk. Butter is very seldom made by these people, nor is cream ever used for that purpose, as it scarcely rises in sufficient quantity. Milk only is used, being agitated in a wooden vessel with a whisk. The butter is of a white colour.

Candles are not in use among the Laplanders, though the tallow of the reindeer is very fit for that purpose, notwithstanding its consistence being less firm than that of ordinary tallow. These people preserve it in bladders, and boil it for food. Each reindeer yields but a small quantity of tallow in proportion to its size, not more than a sheep; having none between the muscles, like oxen and other cattle, but only round them.

Viviparous Bistort (*Polygonum vivíparum*) grew hereabouts two spans in height. The *Trientalis* in moist situations had ob-

tuse petals (see *Fl. Lapp. n.* 139, ε). The Water *Epilobium* in this place had very broad leaves. (*E. palustre* β. *Sp. Pl.* 495. *Fl. Lapp. n.* 148.) *Geranium* (*sylvaticum*) had sometimes a white flower with purple veins, and blue anthers; sometimes the petals, as well as anthers, were white.

THE LAPLAND ALPS.

July 6.

In the afternoon I took leave of Hyttan, and, at the distance of a mile from thence, arrived at the mountain of *Wallavari* (or *Hwallawari*), a quarter of a mile in height. When I reached this mountain, I seemed entering on a new world; and when I had ascended it, I scarcely knew whether I was in Asia or Africa, the soil, situation, and every one of the plants, being equally strange to me. Indeed I was now, for the first time, upon the Alps! Snowy mountains encompassed me on every side. I

walked in snow, as if it had been the severest winter. All the rare plants that I had previously met with, and which had from time to time afforded me so much pleasure, were here as in miniature, and new ones in such profusion, that I was overcome with astonishment, thinking I had now found more than I should know what to do with.

1. *Alchemilla* with fingered leaves, silky underneath, but without flowers. (*A. alpina.*)

2. *Jussiea**, with ternate leaves, abrupt and three-toothed at their extremities. (*Sibbaldia procumbens.*) The calyx is of one leaf, very large, in ten segments, the

* In this and many following instances, the original names in the manuscript are here retained, as a matter of curiosity to the learned botanist, who will be interested in seeing to whom Linnæus extemporaneously dedicated his new genera as they occurred, and who will at the same time admire his sagacity, in determining them, at first sight, so correctly, that not one has subsequently been set aside by any of his severest critics.

five alternate ones of which are smallest, as in the strawberry tribe. Petals five, ovate, yellow, shorter than the calyx, and inserted betwixt its segments. The five stamens also proceed from the calyx. Pistils from five to ten, capitate at their summits, affixed laterally to the middle of the seeds, as in *Alchemilla.* (See the remarks of Linnæus, respecting the natural order of this plant, in *Fl. Lapp. n.* 111).

3. *Dillenia.* Stem woody. Flower purple. (*Azalea procumbens.*) Calyx coloured, small, five-cleft, acute, purple, permanent. Petal one, erect, bell-shaped, five-cleft half way down, acute, purple. Stamens five, shorter than the petal. Pistil one, seated on the embryo, the length of the calyx. Stigma capitate. Seeds numerous, roundish. Pericarp globose, of five cells and five valves. Leaves ovate, evergreen, opposite, resembling those of the Cranberry. (*Vaccinium Oxycoccus.*)

4. *Bannistera.* (*Diapensia lapponica.*) Calyx of large, ovate, imbricated leaves,

first two, then two more, then five, so that they are nine in all. Petal one, with a short wide tube, its disk (or border) in five obtuse spreading segments. Stamens five, from the segments of the calyx (corolla), erect, broad, looking like intermediate prominent segments; the anthers situated on their inner side, at the top. Pistil one, upright, awlshaped. Stigma obtuse. Pericarp round with a point, invested with the calyx, of three cells. Seeds several, round. Leaves oblong, narrow, obtuse, reflexed, lying imbricated over each other.

(Slight sketches only of these plants are annexed to their descriptions in the manuscript, but perfect figures of the two last may be seen in *Fl. Lapp.*)

5. *Saxifraga* with oblong serrated leaves, and lanceolate petals. (*S. stellaris.*) The leaves are about the root, oblong inclining to lanceolate, serrated with a few teeth. Stem naked, with several flowers at its summit. Calyx permanent, five-cleft, acute, reflexed. Petals five, somewhat

spreading, oblong, sharp at each end, white, marked with two yellow dots upon the claw. Stamens ten, awlshaped, the length of the calyx. Anthers purple. Embryo (germen) with two horns. Style none. Stigmas obtuse.

6. *Saxifraga* with palmate five-cleft obtuse leaves. (*S. rivularis.*) Lower leaves cut half way down into five roundish segments; upper one in three segments. Stem short, flowering at the top. Calyx five-cleft, erect. Petals five, ovate. Stamens ten. Embryos two (rather two-horned).

7. *Saxifraga* with a creeping stem, the leaves placed in a quadrangular form. (*S. oppositifolia*). Stems like those of a *Sedum*, creeping. Leaves oblong, obtuse, hairy at the edge, small; the points sometimes bony (or cartilaginous). Flower large. Calyx of five blunt leaves. Petals five, erect, purple, large, oblong, obtuse. Stamens ten, purple, erect, shorter than the petals, with scarlet anthers. Embryo divided. Styles none. Stigmas obtuse.

8. Female Rose-root, *Rhodia.* (*Rhodiola rosea.*)

9. *Rhodia montana abortiens.* (Male plant of the same.) Differs from the female in having five lanceolate petals, and five leaves to the calyx; though often but four.

10. Purple Water *Lychnis*, (*L. dioica,*) a variety with four-cleft petals. (See *Fl. Lapp. n.* 182.)

11. *Pinguicula* with the spur shorter than the petal. (*P. alpina.*) The petal is white with a yellow beard, like a *Melampyrum.* Leaves narrower than in the common kind; spur shorter and funnel-shaped, not cylindrical.

12. *Ranunculus minimus*, leaves three-cleft, their side-lobes divided. (*R. nivalis*, var. γ. *Fl. Lapp. t.* 3. *f.* 3.)

13. *Ranunculus* with bluntly-triangular plaited petals. (*R. glacialis.*) The lower leaves are in many deep segments; the upper three-lobed, their lobes three-cleft. Calyx purplish, hispid. Petals five, very

large, white, dilated upwards, obtuse, plaited at the upper edge. Stamens and anthers erect, numerous, very short, yellow. Pistils many, in a convex head, with slender points.

14. *Ranunculus* resembling Winter Aconite. (*R. nivalis.*)

15. *Draba* with lanceolate leaves and twisted seed-vessels. (*D. incana.*)

16. A small *Hesperis* with a white flower, and oblong flat pods. *Leucojum* of Rudbeck? (*Arabis alpina.*)

17. *Cochlearia* with leaves like *Plantaginella*, (*Limosella aquatica*,) and umbellate pods. (*Cardamine bellidifolia.*)

18. *Andromeda* with leaves like *Empetrum*, and a blue flower. (*A. cærulea.*)

19. *Andromeda* with leaves like a *Lycopodium*, and a white, half-ovate, half-five-cleft flower. (*A. hypnoides.*)

20. *Alisma*, rather *Arnica*, with lanceolate three-ribbed leaves, the radius with three teeth. (*Arnica montana* β.)

21. *Caryophyllata* (*Geum*) with a soli-

tary upright flower. Must it not be a distinct genus? The petals are eight. (*Dryas octopetala.*)

22. An abortive variety of *Saxifraga* n°. 5 (*stellaris*), with small, obtuse, white petals, purple anthers, and a white embryo; but very rarely flowering, as the blossoms are all transformed into clusters of minute leaves. (See *Fl. Lapp. t. 2. f. 3.*)

23. *Pedicularis* with bluntly serrated leaves, and a pale flesh-coloured flower, with a deeper-coloured spot on the lip. The upper lip is narrow; the lower in three equal segments. Calyx large, hairy. Fruit hoary. (*Pedicularis hirsuta.*)

24. Dwarf Catchfly. (*Silene acaulis.*)

25. The same with stamens, but an abortive fruit. Pistils three. Petals obtuse, emarginate. Capsule of one cell. Stamens ten.

26. *Sagina* with emarginate petals and an oblong capsule. Pistils three. Is it an Alsine? (*Stellaria biflora*; see *Fl. Lapp. n.* 158.)

27. *Salix villosa*, with sessile ovate leaves. It is a humble plant. (*S. lanata.*)

28. Subterraneous willow, with orbicular concave leaves; male. (*Salix herbacea.*)

29. Female of the same, with red fruit.

30. *Veronica serpyllifolia*, upright, with a blue flower. (*V. alpina.*)

The lofty mountains, piled one upon another, showed no signs of volcanic fire; but were covered with stones, all of a fissile kind, and by that means easily distinguishable. From the snow, which lay so plentifully on these mountains as to cover half the ground, water was continually running down in streams like so many springs, or like rivers cut through the deep snow, for the refreshment of travellers. We found it very good.

The little alpine variety of the Ptarmigan (*Tetrao Lagopus*) was now accompanied by its young. I caught one of these, upon which the hen ran so close to me, that I could easily have taken her also. She kept continually jumping round and round me;

but I thought it a pity to deprive the tender brood of their mother, neither would my compassion for the mother allow me long to detain her offspring, which I restored to her in safety.

After having walked four or five miles in the course of the night, I went to sleep in the morning in one of the cottages of the country.

July 7.

The inhabitants, sixteen in number, lay there all naked. They washed themselves by rubbing the body downwards, not upwards. They washed their dishes with their fingers, squirting water out of their mouths upon the spoon, and then poured into them boiled reindeer's milk, which was as thick as common milk mixed with eggs, and had a strong flavour. Some thousands of reindeer came home in the morning, which were milked by the men as well as the women, who kneeled down on one knee.

From the top of the head of some of these

reindeer I took out the maggots which trouble them so much. I observed here in plenty the largé fly with a yellow neck, and yellow segments of the body; (*Oestrus Tarandi*,) which probably is the same insect (in a perfect state), as I judge by the length of the legs.

My hosts gave me *missen* to eat; that is, whey, after the curd is separated from it, coagulated by boiling, which renders it very firm. Its flavour was good, but the washing of the spoon took away my appetite, as the master of the house wiped it dry with his fingers, whilst his wife cleaned the bowl, in which milk had been, in a similar manner, licking her finger after every stroke.

I also tasted some *jumo*, which they mixed with reindeer's milk, but it did not please me.

This day I gathered the following plants. (The numbers are continued from *p.* 291.)

31. *Saxifraga* with a tuberous root, a

simple stem flowering at the summit, and bulbs in the bosoms of the leaves. (*S. cernua.*) This has much resemblance to the common Saxifrage, (*S. granulata,*) but bears only one flower at the top of the stem, which is pendulous before it opens. The petals and stamens are white. In the bosom of each leaf are about ten naked anther-like little heads (or buds), which grow out into embryos of future plants. It inhabits watery places.

32. A very small *Juncus*, with a *spatha* of two leaves, enclosing two seeds; (rather capsules, but Linnæus wrote seeds, because it appears by the manuscript that he took the plant at first for a *Carex.*) This is one of the smallest of grasses, bearing a solitary spike, one floret of which has an upright glume, (or leaf of the *spatha,*) the other a reflexed one. The petals are whitish. Pistil snow-white. Stamens six. (This can be no other than *Juncus biglumis*, see *Engl. Bot* t. 898, omitted in Linnæus's own edition

of Fl. Lapp. and supposed to have been first found by the celebrated Dr. Montin in 1749.)

33. *Carex* with several black loose pendulous spikes, one of which is male, two or three female. (*C. saxatilis.*)

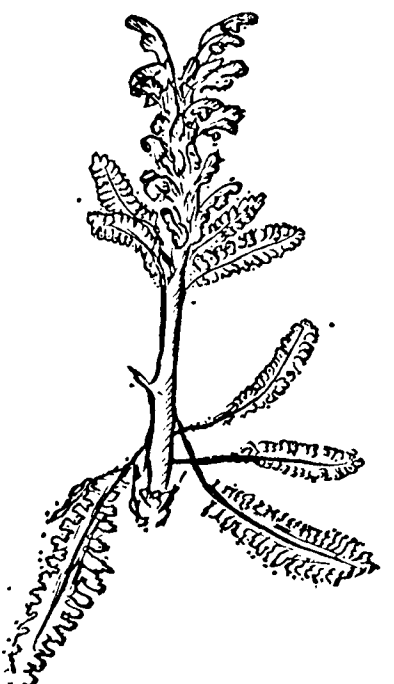
34. *Draba* with a yellow flower. (*D. alpina.*) Pod like the rye-flower. (*D. verna*, see *p.* 5.)

35. *Salix* creeping under ground, with elegant roundish-oval, rugged, rigid leaves. (*S. reticulata.*) Male and female.

36. *Salix* with oblong, obtuse, slightly serrated leaves. (*S. n.* 367, *Fl. Lapp.?*) In marshy places.

The Willows often grow to the height of a man in moist places, or on islands in the rivers, but in elevated situations no tree is more than a foot high; nor is there any plant, except the dwarf birch (*Betula nana*) and the Willows, that affords the inhabitants any wood.

37. A very small *Pedicularis*, with the aspect of the *Sceptrum Carolinum*. The fruit is curved. (*P. flammea.*) This very elegant little plant so exactly represents the *Sceptrum Carolinum*, plentiful here in moist places, one might take it for a representation of that in miniature. The



leaves are brownish, pinnate; their segments imbricated. Flowers four, five, or more, at the top of the stem. Calyx like that of *Sceptrum Carolinum*. Petal with an erect upper lip, which is narrow, compressed, and brownish; the lower lip horizontal, three-cleft, saffron-coloured, like all the rest of the flower. Root like skirrets.

38. *Saxifraga* with oblong, acute, thickish leaves, rough with rigid hairs at the edges. (*S. aizoides.*) It had not yet flowered, but I afterwards found the blossoms, which were yellow, with a large, flat calyx, in five ovate segments. Petals five, small, ovate, yellow besprinkled with orange. Embryo yellow, two-horned. Stigmas orbicular, flat, whitish. Stamens awlshaped, five of them very short.

39. *Juncoides capitulis psyllii*, with loose heads of flowers. (*Juncus campestris.*) Also another with conglomerated heads. (*J. campestris β. Fl. Lapp. t.* 10. *f.* 2. Certainly a distinct species.)

The birds I saw were Snow-buntings (*Emberiza nivalis*); Green Plovers in great plenty, (*Charadrius pluvialis*,) called by the Laplanders *Hutti*; and Wheat-ears. (*Motacilla Oenanthe.*)

The Laplanders of this neighbourhood do not often take the diversion of shooting. They are seldom masters of a fowling-piece; and when not occupied in following or attending the reindeer, they remain in idleness for whole days together, feeding on nothing but milk, and the dishes prepared from it.

I satisfied myself here that the crackling noise made by the reindeer does not originate in the hoof, nor in the lowermost joint of the foot.

The women of this neighbourhood smoke tobacco as well as the men. Every body learns to smoke about the age of twelve or fifteen.

Whenever I gave my host about an ell of twisted tobacco, I was sure to obtain in return a cheese of double its value.

The large-flowered *Cerastium* (*C. al-*

pinum) was here every where in abundance, and the prickly *Lycopodium*. (*L. Selaginoides?*)

The neighbouring mountain abounded with a very black fissile aluminous stone.

The surface of the snow appeared to have a vibratory motion, like water slightly agitated, or like a large white sail swelled by the wind.

All the inhabitants of this neighbourhood wore garments made of reindeer skins.

July 8.

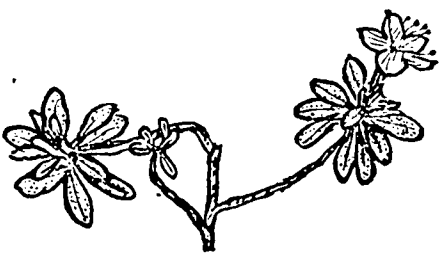
The plants I found this day were the following.

40. *Michelia.* (*Azalea lapponica.*)

Its calyx is inconspicuous, green, in five obtuse segments. Petal one, erect, gradually dilated upwards, divided almost down to the base into five ovate segments, purple, deciduous. Stamens five, proceeding from the receptacle, erect, shorter than the petal, purplish, thread-shaped, with roundish anthers. Pistil one, thread-shaped,

inclining to one side, longer than the petal, with a globose embryo, and thick stigma. Pericarp membranous, globose, of five cells and five compressed valves, the cells fixed to the column, as in *Ledum*, bursting at the top. Leaves thick, ovate, evergreen, clustered at the tops of the branches, as in *Ledum*. Flowers about three, at the extremity of each branch, each on a simple uncoloured stalk. Is this the same genus with *Dillenia* (*Azalea procumbens*, n°. 3.)? I think not. In that the calyx and flower-stalks are coloured; two flowers proceed from each bud; the petal is firm, and cut but half way down; the calyx is half as long as the petal; the pistil is erect, shorter than the petal; the stamens are directed inwards, and not attached to the receptacle. (Notwithstanding these reasons, Linnæus united the two plants together in his *Flora Lapponica*, as one genus, under the name of *Azalea*, quoting two synonyms of Tournefort and Bauhin for this n°. 40, which belong to *Rhododendrum ferrugi-*

neum, his own plant being entirely new, if not a pentandrous variety of that *Rhododendrum*, which is much to be suspected.



The above description, of the fruit especially, is sufficient to show it cannot belong to the same genus with *Azalea procumbens*, though perhaps it may accord better with the American *Azaleæ*.)

41. *Campanula* with a contracted flower. (*C. uniflora.*) Differs from the common blue kind, (*rotundifolia*,) in having the leaves as well as the flower much contracted at the base, so that the latter is funnel-shaped. The embryo is oblong, with six sides, rough, with three orifices near the base of the calyx.

42. *Lychnis* with a concealed flower.

(*L. apetala.*) Leaves pink-like. Flower solitary at the top of the stalk. Calyx ovate, inflated, closed, with ten black hispid ribs, which branch near the top. Petals five, oblong, brownish, shaped exactly like the usual claws of a *Lychnis*, but without any border. Stamens ten. Embryo oblong, inclining to cylindrical, contracted in the middle, obtuse, blackish. Pistils five, whitish. The petals, stamens and pistils are all concealed within the calyx.

43. A small *Aster*, with one solitary white flower. (*Erigeron uniflorum.*) It has the calyx of the *Amellus*, the flower of a daisy, white with a yellow disk.

44. A viviparous grass, *Poa.* (Rather *Festuca vivipara.*)

45. *Juncus* with a sharp rigid point. (*Juncus, n.* 116. *Fl. Lapp.*)

46. A Catchfly which is not viscid, with the flowers collected into a tuft. (*Lychnis alpina.*)

47. A smooth *Cerastium*, agreeing in

every respect with the large-flowered one, except the hairiness and hoary aspect of the leaves. (*C. alpinum*, a smooth variety.)

I observed every where about the sides of the hills holes dug by the Lemming Rat. (*Mus Lemmus.*) Hares are grey in summer upon the alps.

No herb or tree on the highest parts of these alps attains more than a quarter of an ell in height, though in the valleys the same species may perhaps be two or three feet high. Birch trees, which however are very scarce, creep in a manner under the earth, throwing up the tips of their branches here and there to the height of a quarter of an ell. Tender shoots of this kind sometimes conceal a very knotty depressed stem.

In the evening, and indeed till the night was far advanced, we sought for one of the Laplanders' huts, but to no purpose. Tracts made by the reindeer were plentiful enough in the marshy grounds, which we followed sometimes in one direction, sometimes in another, without their leading us

to what we were in search of. I had walked so much that I could hardly stand on my legs, and was near fainting with fatigue, so that I lay down, resolving rather to endure the cold and boisterous wind, than proceed any further this night. At length the Laplander and his servant, who were my guides, found some dung of the reindeer. One of them took it up, and after squeezing it in his hand and smelling at it, gave it to his companion to smell also. He was even desirous that I should take a snuff at it. By its freshness they were rejoiced to discover that a Laplander with his herd had but recently left this spot, and they accordingly pursued a track which was here and there discernible in the snow. After we had proceeded half a mile, we met with the object of our search, who had removed but the day before, so that I had now an opportunity of taking some repose.

July 9.

Fatigued with my late journey, I re-

mained here all the following day and night, not only because it was Sunday, but because I was too much tired to undertake to cross the ice that day. Near the icy mountains the water of the neighbouring lakes was frozen to the depth of a fathom. I employed myself in making the following memorandums.

I was told that *Fungi* are very plentiful in the alps in autumn.

Scarcely any other fish is found in the lakes of this neighbourhood than the *Röding*, which the Laplanders call *Raud* (*Salmo alpinus*, or Charr), and this is extremely abundant. It is a Salmon, or rather Trout, with a scarlet belly. Its length is about a foot. The scales are extremely minute. Head smooth, ovate, obtuse. Jaws furnished with teeth, and the tongue also bears two rows of teeth, six in each row. The palate moreover is toothed at each side. Nostrils small, with two holes to each, one above the other, the lowermost largest, and capable of being closed. Iris of the eyes

grey, with a black pupil. Below each eye, in the cartilage of the cheek, are seven little hollow points ranged longitudinally, and in its hinder part are three others placed perpendicularly. The rays which cover the gills are ten on each side, connected together. Fin of the back with twelve rays, of which the two foremost are gradually longer, the third and fourth longest of all and subdivided. The whole fish is black in the upper part; its sides of a sky blue; head and throat white underneath; belly reddish-yellow. The ventral fins are red, with a white exterior edge. Many yellowish spots are scattered longitudinally along each side of the fish near the lateral line. The tail is of a brick-colour, and forked. The flesh is red, and very palatable. The people here caught fifty of these fishes with two hauls of the net, of which they made a dinner for me and themselves. One dish consisted of the fresh fish boiled, which was not agreeable to my palate for want of salt. Others were roasted on a wooden

spit before the fire, but for the same reason I could hardly taste them. The third mode of preparation was the most acceptable to me, and had a very good flavour. This was made of the dried and salted Röding, roasted on a spit. The Laplanders drink the water in which the fish has been boiled, which I was unable to do,—though I could not but commend the practice, as favourable to digestion.

The reindeer are innumerable, like the forests they inhabit. The herds are driven home, night and morning, to be milked. It was amusing to observe the manner of driving them, performed by a maid-servant with a dog. If the reindeer proved refractory, the dog easily made them obey the word of command, particularly when seconded by the hissing of the woman, at which they were extremely terrified.

I observed also the manner of driving them out to pasture. The wind blowing hard from the east, their conductress preferred a circuitous path, rather than face

the storm. The reindeer, on the contrary, delighting to run against the wind, turned homeward when diverted from their inclination, while the dog ran after the woman. When these animals are permitted to face the wind, they run very fast and without intermission, in hopes of finding a place to cool themselves. Indeed I observed one of the herds crowding close together under the shadow of a hill, on a spot covered with snow, to avoid the heat caused by the reflection of the sun from the snow in other places. These animals will eat nothing in hot weather, especially as the gnats are then very troublesome. The males much resemble stags, but none in any of the herds had now more than one branch to their horns.

The head of the reindeer is grey, blackish about the eyes. Mouth whitish. Nostrils oblique. Tail short, not above six inches long, obtuse, white, concealed between the haunches. Feet encompassed with white above the hoofs. The whole body

is grey, blacker when the new coat first comes on, whiter before it falls. The hair is not readily plucked off, but easily broken. The horns of the female are upright, or slightly bent backward, furnished with one or two branches in front near the base, the summit sometimes undivided, sometimes cloven. Those of the male are often two feet and a half long, and their points are as far distant from each other. They are variously branched, with more or less numerous subdivisions. These animals cast their horns every year; the males immediately after the rutting season, about the end of November; the females in May, after they have brought forth their young. If the females are barren, it is known by their casting the horns in winter*. Those

* These particulars concerning the casting of the horns of the reindeer, much confused in the manuscript, are corrected from the admirable history of this animal in the *Amœnitates Academicæ, v.* 4. 150. It is there said that the castrated males also cast their horns, but rarely before they are nine years old. The sooner they begin, the more healthy they are esteemed.

of the males scarcely differ from the females in general structure. Both are hairy, but the hairiness falls off before Michaelmas. In some which I have seen broken, the inside, under the skin, of the young growing horns, appears like a cartilage. Hence they are flexible, and so very sensible, that the animal can scarcely bear to have them handled. Under a narrow layer of cartilage, the whole cavity is full of blood-vessels. When arrived at their full growth, the horns are bulbous at their base, like those of a stag.

The length of the leg of the reindeer, from the joint of the foot to that next the body, is two feet. From this latter joint to the top of the back is also two feet. From the shoulders to the tail two feet. From the shoulders to the horns one foot, and the same from the horns to the mouth. From the belly to the back, that is, the perpendicular measure of the trunk, is a foot and half.

As the reindeer walks along, a crackling

noise proceeds from its feet. This excited my curiosity; and inquiring what was supposed to be the cause, the only answer I could get from any one was, that "our Lord had made it so." I inquired further in what manner our Lord had formed the reindeer so as to produce such an effect; but to this the respondent answered nothing*. When I laid hold of the animal's foot, pulled it, twisted and stretched it, or pushed it backward and forward in every possible way, no crackling was produced. At length I discovered the cause in the hoofs themselves, which are hollowed at their inner side. When the animal stands on its feet, the hoofs are, of course, widely expanded, and their points most remote from each other; but every time the foot is lifted from the ground, they strike together, and cause the noise above mentioned. This I was afterwards able to imitate at pleasure, by moving the foot with my hand.

When the reindeer are driven to the

* "Sed ad hoc Sorberius nihil."

place where they are accustomed to be milked, they all lie down, breathing hard and panting violently, chewing the cud all the while. The report of Scheffer therefore, that they do not ruminate, is false, and Ray guessed more correctly than Scheffer observed.

When the fawn is missed by its mother, she runs in search of it with the most violent anxiety, stooping with her nose to the ground like a sow, till she finds it. She even quits the herd to which she belongs, and seeks her young at the Laplander's hut.

After the herd has lain down in the manner above described, each of the people takes a small rope, and, making a noose, throws it over the head of one of the females intended to be milked. The cord is afterwards twisted round the horns, and the other end tied to a small pole fixed in the ground. One pole is sufficient to secure four of the animals, which all hands are afterwards employed in milking, both master and mistress, men and maids. If the

milk does not come with facility, they beat the udder very hard with their hands; which causes a greater flow. The dugs are four, very rarely six, all yielding milk, and none of them dry. The young are not separated from their mothers. After the herd was milked and gone to pasture, I observed the maid-servant taking up some of the soft black dung, which, after kneading it with her hands, she put into a vessel. On my inquiring what could be the use of this, she answered that the dugs were besmeared with it, to prevent the fawn's sucking too much. She added that it would dry upon the nipple by the morning after it was applied, and might then be easily rubbed off. The female reindeer bring forth their young early in May, and their owners begin milking them on Midsummer day, and continue to do so till the beginning of November in the forests, but in this neighbourhood they leave off milking about Michaelmas. The fawns acquire horns the first year, which are perfectly simple, like

fingers. I could not help wondering how the Laplanders knew such of the herd as they had already milked, from the rest, as they turned each loose as soon as they had done with it. I was answered that every one of them had an appropriate name, which the owners knew perfectly. This seemed to me truly astonishing, as the form and colour are so much alike in all, and the latter varies in each individual every month. The size also varies according to the age of the animal. To be able to distinguish one from another among such multitudes, for they are like ants on an anthill, was beyond my comprehension.

July 10.

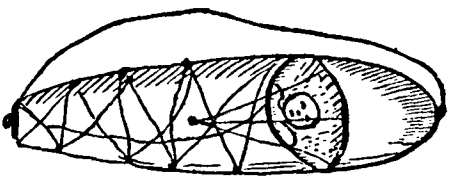
I witnessed with pleasure the supreme tranquillity enjoyed by the inhabitants of this sequestered country. After they have milked their reindeer, and the women have made their cheese, boiled their whey to the requisite consistence, and taken their simple repast, they lie down to enjoy that

sound sleep which is the reward and the proof of their innocent lives. There is rarely any contention among them. The inhabitants of the neighbouring moveable village had pitched their tents close together in lines, either from east to west, or otherwise. When my servant came in, he put his nose close to that of any person whom he wished to salute, as if he had intended to kiss him, saluting him with the old expression "*purist.*" I inquired whether they actually kissed each other; but my man answered in the negative, that they only put their noses together. This custom is in use among relations only.

A boy had been sent out to gather sorrel (*Rumex Acetosa*), the larger kind, or variety, of which he brought home enough of the leaves with their stalks to fill a kettle. A small quantity of water was poured upon it, just sufficient to cover the bottom of the kettle. It was kept stirring over the fire, and allowed to boil, till the whole was reduced to a pulp. This was afterwards

mixed with milk, and put into large barrels. When it has stood by for some time, it acquires an agreeable sourish taste, quite different from the flavour of the fresh plant. The barrels thus filled are preserved in holes, dug in the ground for the purpose, either lined with brickwork, or with birch bark, to protect them from rats or mice.

Another boy came in with as much as he could carry in his arms of the stalks of *Angelica* (*sylvestris*) which had not yet flowered. The people stripped off the leaves, and by means of a knife peeled the stalks, the skin of which came off like hemp. They ate the remainder as they would an apple, thinking it a great delicacy. I partook of it with them. The broad sheathing footstalks of the leaves, which enfold the young umbels, not being esteemed good to eat fresh, were peeled, and added to the *syra*, see p. 243, which was destined to make *jumomjölk*, see p. 273.



In the hut where I was a guest, an infant lay in its leather cradle. Its head was protected by a screen of leather, and at the sides two longitudinal pieces of cloth, folding one over the other, were drawn together by a cord, over the child's body, which was besides covered with reindeer skins underneath. The head, breast, and shoulders were bare. It lay in this state all night long in the cold tent, and was exposed to the open air at other times, though the weather was very cold; yet the child did not suffer any inconvenience.

I slept every night between two reindeer skins.

I was treated with *östamus*, or milk turned to curd by rennet, which, together with a great proportion of cheese that I had eaten of late, disagreed violently with me, and almost brought on a *tenesmus*.

The women here, as well as the men, smoke tobacco, and indeed do almost every thing but actually wear breeches. The men dress the meat, while the women employ themselves only in making cheese, and other various preparations of milk. Every kind of fish or meat is cooked by the men; and if the women happen not to be at hand, even the cheese and milk fall under their management.

The alps are destitute of human inhabitants in the winter season, because the Laplanders are then obliged to seek more woody parts of the country, where alone they are able to find a sufficient quantity of moss (*Lichen rangiferinus*) to feed their reindeer. On the alps there is not only a want of wood, but the snow is covered with too hard a frozen crust to be penetrated so as to come at any thing beneath it.

The poorest people only remain here as long as possible, for the sake of catching Ptarmigans (*Tetrao Lagopus*); which is done in the following manner.

They take a little forked birch twig, about a span long, which is stuck into the snow perpendicularly by its divided end, forming a sort of arch. A snare or noose, made of packthread or horsehair, is then fixed to the twig by one end, and placed in the open space between the forks. The thin curling bark of the twig, being carefully slit down at the outer side, curls inward, and serves both to confine and conceal the snare, by drawing it close to the branch on the inner side. Such traps as these are ranged in a line, about a fathom from each other, in the birch thickets, brush wood being laid from one to another, so as to form a low fence. Now as the Ptarmigans come running along, for they seldom fly, they have no way to go but through these snares, and forty or fifty of them are frequently caught at a time.

This day I both heard and saw the Cuckoo (*Cuculus canorus*), which the Laplanders call *Geecka;* and also the great fishing Gull with a grey back (*Larus*

canus), to which they give the name of *Staule*; (not *Straule*, as in the *Fauna Suecica*.)

The *Andromeda* (*hypnoides*) with leaves like moss, or needle-shaped, was here in flower. The petal is bell-shaped, white tipped with purple, divided half way down into five semi-ovate segments. Calyx five-cleft, erect, acute. Anthers orange, very short, furnished with white bristles. Pistil one, obtuse.

In walking over the snow, I once sunk up to my middle, the floods having undermined it to a great depth. Two men drew me out with a rope, and I received no damage except a blow on my thigh and being very wet. Soon afterwards I met with a Laplander who was both a Danish and Swedish subject. He offered me brandy, which I would have declined; but he insisted on my taking a glass, and some tobacco.

The water of the lake of *Virijaur* (perhaps *Wire-jaur*) was of a whitish green

colour, exactly like water poured into a vessel previously used for milk. This appearance arose merely from its extreme purity, levity, and consequent transparency. It was cooler than the water flowing from the snow.

Not far from this lake, on the left, upon the side of the mountain called *Kaitsoniunni*, near a rivulet, I picked up a curious stone or radiated *fluor*, of a blueish colour, composed of square parts (probably zeolite). In the evening it rained, but I observed the *Papilionoides* with purple spots (*Sphinx Filipendulæ*).

The stones hereabouts were mostly fissile, horny; some black and aluminous, but generally horny and spontaneously decomposing, with silvery talc, rarely any quartz.

July 11.

We rose early this morning, and after walking a quarter of a mile arrived at the lofty icy mountain. This is indeed of a very great elevation, and covered with

perpetual snow, the surface of which was, for the most part, frozen quite hard. Sometimes we walked firmly over it, but it occasionally gave way, crumbling under our feet like sand. Every now and then we came to a river taking its course under the snowy crust, which in some parts had yielded to the force of the currents, and the sides of each chasm exhibited many snowy strata one above another. Here the mountain streams began to take their course westward, a sign of our having reached Norwegian Lapland. The delightful tracts of vegetation, which had hitherto been so agreeably interspersed among the alpine snows, were now no longer to be seen. No charming flowers were here scattered under our feet. The whole country was one dazzling snowy waste. The cold east wind quickened our steps, and obliged us to protect our hands that we might escape chilblains. I was glad to put on an additional coat. As we proceeded across the north side of this

mountain, we were often so violently driven along by the force of the wind, that we were taken off our feet, and rolled a considerable way down the hill. This once happened to me in so dangerous a place, that, after rolling to the distance of a gunshot, I arrived near the brink of a precipice, and thus my part in the drama had very nearly come to an end. The rain, which fell in torrents on all sides, froze on our shoes and backs into a crust of ice. This journey would have been long and tiresome enough without any such additional inconvenience. At length, after having travelled betwixt three and four miles, the mountains appeared before us, bare of snow though only sterile rocks, and between them we caught a view of the western ocean. The only bird I had seen in this icy tract, was what the Laplanders call *Pago* (*Charadrius Hiaticula*). Its breast is black, throat white, feet orange.

Having thus traversed the alps, we arrived about noon upon their bold and pre-

cipitous limits to the westward. The ample forests spread out beneath us, looked like fine green fields, the loftiest trees appearing no more than herbs of the humblest growth. About these mountains grew the same species of plants that I had observed on the other side of the alps. We now descended into a lower country. It seems, as I write this, that I am still walking down the mountain, so long and steep was the descent, but the alpine plants no longer made their appearance after we had reached the more humble hills. When we arrived at the plains below, how grateful was the transition from a chill and frozen mountain to a warm balmy valley! I sat down to regale myself with strawberries. Instead of ice and snow, I was surrounded with vegetation in all its prime. Such tall grass I had never before beheld in any country. Instead of the blustering wind so lately experienced, soft gales wafted around us the grateful scent of flowery clover and various other plants. In the earlier part

of my journey, I had for some time experienced a long-continued spring (whose steps I pursued as I ascended the Lapland hills); then unremitting winter and eternal snow surrounded me; summer at length was truly welcome. Oh how most lovely of all is summer!

Here grow, for the most part, the common plants of Upland, besides which I noticed *Aconitum lycoctonum*, and the little Mountain Catchfly with a white upright flower (*Silene rupestris**); as also *Coronopus maritimus punctatus* (*Plantago maritima β, Fl. Suec.* 46), *Mesomora* (*Cornus suecica*), and the Cloudberry (*Rubus Chamæmorus*).

By this time I was heartily tired, and found the refreshment of some cow's milk, and meat, with a chair to sit upon, very acceptable. I could not but wonder to see my two Laplanders, who had accompanied me during the whole of this day's tedious

* This appears by the *Flora Suecica* to be likewise a native of Upland.

walk, one of them fifty years of age, the other upwards of seventy, running and frisking about in sport, though each of them had carried a burthen all the way; not indeed a very heavy one, but, considering the distance, by no means trifling. This set me seriously to consider the question put by Dr. Rosen, "why are the Laplanders so swift-footed?" To which I answer, that it arises not from any one cause, but from the cooperation of many.

1. The Laplanders, unlike us, wear no heels to their half boots. We see dancing-masters and rope-dancers, with little or no heels, perform feats of great agility, scarcely practicable with them. The same may be observed of running-footmen, and people of various countries who habitually walk fast; while, on the contrary, those who are accustomed to large and high heels, move in a heavy and deliberate manner. It is usual to shoe young horses heavily, that they may acquire a steadiness of pace; and I observe that the country boys where

I am now writing, throw off their shoes when they intend to run, as the heels with which these shoes are made, deprive them of half the natural control of the muscles in the soles of their feet. Those muscles, by means of high heels, and consequently less use or exercise, become more and more stiff, and a man with a wooden foot or leg cannot but move heavily.

2. These people are accustomed to running from their infancy. As soon as a Lapland boy can go alone, he is taught to run and put a halter round the reindeer's neck. When he grows a little older, he learns to follow these animals, which are always quick-paced, insomuch that it is more laborious to keep up with them than with a herd of goats, and more difficult to run after them than to frisk about with a parcel of calves. If therefore a rope-dancer, or a running-footman, acquires great agility by perpetual practice, no wonder that a Laplander, who till he is married, and often all his life long, runs habitually after

the reindeer, should rival any of them in swiftness of foot.

3. Freedom from hard labour is another cause. All laborious employments, such as directing the plough, threshing, cutting and hewing of wood, &c. render the blood thick, and the limbs stiff. Hence the flesh of a peasant is hard and tough, that of a young damsel soft and tender; nor can a peasant move with the lightness and flexibility of limbs that we see in a girl. How delicate are the muscles of children compared with those of an aged person! The Laplanders appear to be more nimble and active, in all their movements, because they undergo no hard or Herculean labours.

4. Habitual exercise of the muscles. A rope-dancer trains his pupils to the continual contraction and dilatation of their muscles, that they may acquire the more pliability. A dancer is at first taught by violence to turn out his toes; but by custom that position becomes easy, for use is second nature. So the Laplanders are

perpetually exercising the muscles used in walking, which thence become so flexible, that they are able to sit for a long while cross-legged, without pain or inconvenience, in a posture intolerable to us, who are used to commodious seats. For my own part, since I set out on my journey, I have become able to walk four times as far as I could at first.

5. Animal food. It is observable that such of the creation as feed on vegetables, are of a more rigid, though strong, fibre; witness the Stag, the Bull, &c.; while, on the contrary, carnivorous animals, as the Dog, Cat, Wolf, Lion, &c., are all more flexible. The fact and its cause are both evident. The Laplanders are altogether carnivorous. They have no vegetable food brought to their tables. They now and then indeed eat a raw stalk of Angelica, as we would eat an apple, and occasionally a few leaves of Sorrel; but this, compared with the bulk of their food, is scarcely more than as one to a million. In spring they eat

fish, in winter nothing but meat, in summer milk and its various preparations. It may further be remarked, that salted food, which these people do not use, renders the body heavy.

Here I cannot help making a few incidental remarks, on the opinion that man is proved, by his teeth, to be formed to eat all kinds of food. Those who advance this opinion say, his front or cutting-teeth are like those of animals that eat fruits or nuts, as the Hare, Rabbit, Squirrel, &c.; his canine, or eye-teeth, like those of beasts of prey, as the Cat; and his grinders like those of animals that live upon herbage, as the Cow, Horse, &c. But this reasoning is not altogether satisfactory to me. If, in the first place, we examine the human fore-teeth, we shall find them quite different from those of nut-cracking animals of the Squirrel or Hare tribe, which are more prominent, and rather spreading than erect at the angle, whereas ours are perpendicular, with their summits close and level. Hence

the fore-teeth of such animals are very long, witness those of the Beaver. Some carnivorous animals have similar fore-teeth to ours, but have we any such canine teeth as theirs? They do not exceed ours in number, but they are much more important. The being furnished with grinders as such, will not, on the other hand, class us with herbivorous animals, although Bulls and Cows have them; for the Dog and Cat, and all other carnivorous ones, have grinders likewise. I have not yet met with any herbivorous animal, with a simple stomach, which is not subject to eructation, nor is the Mouse tribe any exception.

But to decide concerning our own species. If we contemplate the characters of our teeth, hands, fingers, and toes, it is impossible not to perceive how very nearly we are related to Baboons and Monkeys, the wild men of the woods. In as much therefore as these are found to be carnivorous, the question is decided with respect to ourselves.

6. The Laplander is satisfied with a small quantity of food at once. He does not eat his fill at one meal, but takes food from time to time, as he feels inclined.

On the contrary, the peasants of Finland cram themselves with as many turnips, and those of Scania with as much flummery, as their stomachs can possibly receive. The inhabitants of Dalecarlia eat till the body is as tight as a drum: Such people are much better qualified to labour in the cultivation of the ground, than to run over the alps. The Laplanders are always of a thin slender make. I never saw one of them with a large belly. Milk diet also contributes to render them active.

7. I examined their knees, ankles, and feet, but could not perceive the least difference in their shape from those of other countries, except perhaps that the sole of the foot seemed rather more concave, at the inner side, than usual. How far this may make any difference, a better mechanic than I am must determine.

8. All the Laplanders are of a small stature. I have never yet met with any of them so tall as myself. A large heavy body cannot move so nimbly as a small one, even though its organs are proportionably stronger and more durable. This is apparent in many similar cases. A little pony from the isle of Oeland, or one of a similar kind from Norway, runs with extreme velocity; for though a great trooper's horse may get before it, the little animal moves its legs with astonishing rapidity, and much quicker than the great horse.

There is a striking difference in stature between the inhabitants of Helsingland and those of Lapland, nor is the reason of this difference at all obscure. If we give a young puppy plenty of food, he will grow large; if but little, he will turn out small. If kept warm, he will also grow to a much larger size than if he is always inured to cold. The same remarks may be applied to the people in question.

Another subject of inquiry is, why the Laplanders are so healthy; for which the following reasons may be assigned.

1. The extreme purity of the air, which seemed to give me new life as I inhaled it.

2. The use of food thoroughly dressed.

3. Eating their food cold; for they always let their boiled meat cool before they taste it, and do not seize it with avidity as soon as it comes out of the pot.*

4. The purity of the water.

5. Tranquillity of mind. They have no contentions, neither are they over and above careful about their affairs, nor addicted to covetousness. Their lives are protracted to extreme old age.

6. Their never overloading the stomach, while the rustic of other countries eats till he is ready to burst.

7. Deficiency of spirituous liquors. Of these they rarely taste, and only in such

* Linnæus's expression is, "they do not spring upon it with boots and spurs."

quantities as to be rather beneficial than otherwise.

8. Their being inured to cold from their infancy renders them hardy.

9. Probably the quantity of flesh they eat may prolong their lives, as carnivorous animals are long-lived.

NORWAY.

I saw no flies in Lapland, but in Norway the houses are full of them. I was however no longer infested with swarms of gnats.

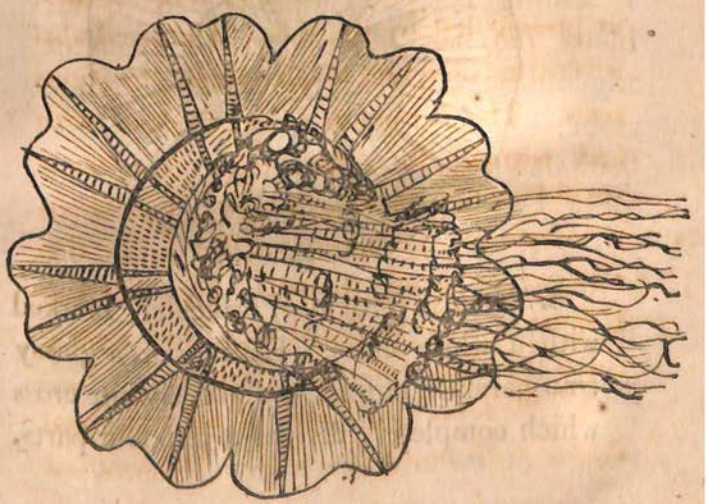
At the place where I stopped to rest after my fatiguing journey, they gave me Sword-fish (*Xiphias Gladius*) to eat, which very much resembled Salmon in flavour. It was of a large size, with a dorsal fin continued from the middle of the back to the tail.

July 12.

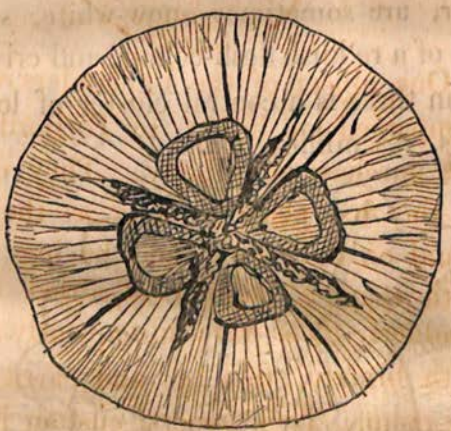
The next day it blew so very hard that I did not venture to leave this place by sea. I took a walk in the morning on the beach, it being low water, and noticed various marine productions. Several species of *Fucus* were attached either to stones or shells, as well as *Ulvæ* and *Confervæ*. Barnacles (*Lepas Balanus* and *L. Balanoides*) were seen sticking to large stones, at present left by the tide. I noticed also several univalve and bivalve shells of various sizes. The *Strombus* (*Pes pelecani*) with and without its dilated lip; also some small Crabs, and other things. I gathered a viviparous avenaceous grass (what this was cannot be ascertained). Here likewise I noticed several Zoophytes, and among them the three following *Medusæ*.

1. *Medusa* (*capillata*) of an octagonal shape, with notched angles. The annexed

figure shows its under side. The whole is transparent like glass. There are eight pair of rays, within which the disk, and other rays at the base of the former, are all covered with minute scaly prickles, ranged in concentric circular rows. The outer feelers, which look like the stamens of a flower, are sometimes snow-white, sometimes of a reddish flesh-colour, and crisped. Within these is a central cluster of longer feelers, resembling pistils.

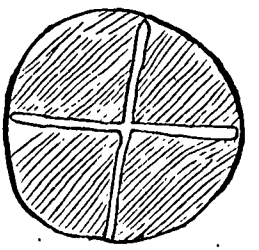


2. *Medusa* (*aurita*) orbicular, with four little hearts in the middle. This is also entirely pellucid like glass, except that the little heart-shaped marks are red, each with a transparent cavity in its centre. There are four crisped auricles, or feelers, between them.



3. *Medusa* (*cruciata*) orbicular, marked with a white cross. Entirely of a glassy transparency, but marked with a white cross which completely divides it into four parts,

There are no feelers, nor could I discern any vestige of a mouth. Can this be in the state of an egg?



One object of the Laplanders who accompanied me hither, to Torfjorden, was the purchase of brandy. They drank it in the first place as long as they could stand on their legs, and having brought with them a number of dried reindeer bladders, these were subsequently all filled with brandy, tied up, and carried away by them. Their general custom is to use small cups, about one third the size of a spoon, by means of which each Laplander in his turn will often contrive to swallow a whole quartern of brandy.

When the Laplanders mean to appear in full dress, they attire themselves in

white *walmal* cloth, (see *p.* 137,) without any lining, and their jacket is ornamented with a high blue collar with a brown edge, the whole collar being stitched over and over with thread. The cloth for this part costs a dollar, copper money, extraordinary for every ell, on account of the brown edge. Eight ells make a jacket, so that the whole comes to as much as a small garment of reindeer skin.

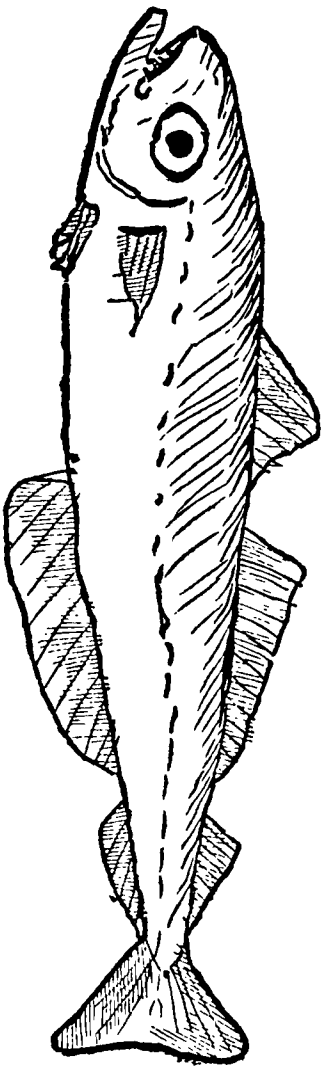
They complained to me about the sale of their manufactures, which they are now obliged to dispose of at too low a rate. They would willingly allow twenty per cent. profit to the merchants of Stockholm, giving them a preference that they might be enabled to pay the duties, nor would they then listen to applications from any other quarter.

The Lapland women are accustomed to sew all the clothes and shoes, and to cook all such articles of food as are made of milk; but the men dress the meat, fish, and fowl. If the housewife happens not

to be at hand, the preparation of the milk dishes falls upon the husband, but not otherwise. The Laplanders in this part of Norway, who have become cultivators of the ground, use scythes whose upper end rests on a projecting piece of wood set on the ground, as on a pivot, another piece opposite to it serving for a handle.

This was a very hot day, with a few drops of rain in the afternoon.

The weather being now calm, we ventured to go out to sea in a boat, in order to search for the natural productions of that element. We soon caught, with a hook and line, plenty of Sey-fish (*Gadus virens*). These were about ten inches long, very smooth, fat and tender, covered with extremely minute scales. The back was of a darkish green, the belly white. The mouth toothed, like that of a perch. Some of these fish had sticking to them several *Remoræ*, or rather *Pediculi marini* of Frisch, of which I preserved specimens. (*Lernæa Assellina?*) The fish themselves



were so numerous and so voracious, that we had no sooner thrown out the hook, letting it float after the boat, than they swallowed it so quick that we could hardly take them out fast enough. The next day however, the sky being very clear, we had no such success. The hook we used was of steel, without any kind of bait, and yet we caught above sixty fish in all.

Torfiolme, where I now was, is entirely encompassed by lofty mountains covered with snow. Between their summits dark grey clouds were stationed here and there, so that the base of each mountain, as well as the summit itself, was clear. These clouds, or vapours, at length gradually subsided.

Close to the borders of the bay or creek, are many little sequestered villages scattered among the hills. Each has but a small valley adjoining, and consequently not above a cornfield or two within its district, with a very small portion of pasture-ground attached to each house, though possibly there might be more further off, which I

could not perceive. The inhabitants therefore would scarcely be able to subsist, were it not for the vast plenty of fish within their reach, which serves them for food and for sale. The sea here not only abounds with a great variety of species, but the individuals of each are also uncommonly numerous. The people were continually talking to me about the whale fishery.

I had here an opportunity of seeing how salmon are caught. Some piles are placed in the mouth of a little creek or cove, adjoining to a small fence or row of pales. Close to this a perpendicular net is placed in the water, in a curved position, one end being fastened to the shore, the other to two cords, while the middle is floated out, by means of a buoy in the mouth of the creek, towards the sea. When the fish swim up the creek to a certain distance, they are entrapped in this net, the cords being pulled by two people stationed in a hut adjoining, built for the purpose of watching the net.

The plant here called *Missne*, and used for food by the people, is the Water Dragons (*Calla palustris*); while that given to cattle is the *Menyanthes* (*trifoliata*). Horses are fed with the finest tops of the twigs of spruce fir, chopped extremely small, and mixed with an equal quantity of barley. Such feed is used only in times of great scarcity, but it is very excellent provender.

The church of this place is but small.

The herbs I collected hereabouts were *Mesomora* (*Cornus suecica*) with a proliferous blossom. *Spergula marina* with spatulate petals, ten stamens, and three very short pistils, (*Arenaria peploides*). *Apium palustre* (*Ligusticum scoticum*). *Trifolium* with a monopetalous flower, of a white colour, (*T. pratense*). *Muscipula montana minima* (perhaps *Gypsophila muralis*, see *Fl. Lapp. n.* 171). *Gramen triticeum maritimum, flore glauco*, (*Elymus arenarius?* see *Fl. Lapp. ed. 2. n.* 34). *Glaux* (*maritima*). A *Fucus* in long strips, re-

sembling flax; with many other species of that genus. *Filum marinum, in aquâ villosum.* *Coronopus* with dotted leaves (a variety of *Plantago maritima*). There were numerous *Echini* (Sea Urchins), as well as *Patellæ* (Limpets), and *Balani* (Barnacles); all so abundant on the shore that we could scarcely walk without treading upon them. I noticed likewise some kinds of Star-fish (*Asterias*), with many Corallines, and petrified Corals. (See Linnæus's dissertation, entitled *Corallia Baltica, Amœn. Acad. v.* 1. 74.)

In the evening we arrived at the parsonage house of Rorstad, the residence of Mr. John Rask, *Pastor Secundarius*, and chaplain to the king. He has been in the West Indies, as well as Africa, and has published an account of his voyage, in which various fishes and plants are described in a very interesting style. He gave me a friendly reception. He has a handsome daughter named Sarah Rask, eighteen years of age. She seemed to me uncommonly

beautiful. I must not omit to write to him hereafter; for, according to his account, he never expected to see an honest Swede. I wish Mr. Ingerald* may come and visit our neighbourhood, that I may have an opportunity of testifying my gratitude for his kindness, which otherwise I can never repay.

July 14.

In the morning I took leave of Mr. Rask, and returned with the master of the boat to Torfjorden. I had now before me the whole of this western Archipelago, and was told that, if we were to steer our course directly westward, we should arrive at Greenland. The conversation on our passage turned much upon a certain West Gothlander, who had been guilty of some treacherous conduct, and told various falsehoods. (To this the above conversation of Mr. Rask probably alluded).

* Who Mr. Ingerald was, does not appear. Perhaps the master of the boat, or somebody whom Linnæus met at the house of the good curate.

Tun-bread, as it is called in Westbothnia, is made of barley and chaff in the following manner. After threshing, they sift the corn through a large cribble, which retains not only the grain and chaff, but not unfrequently a small quantity of straw. This is dried and ground. The rich grind the corn alone; others one third part barley, with two of chaff; others again one of chaff to two of barley. The meal thus procured is moistened with cold water into a paste or dough, without being allowed to go into a state of fermentation, and without any yeast. Cold water is preferred to warm, the latter rendering the dough too brittle. The dough, being of a soft consistence, is then well kneaded on a table. A handful of it is sufficient to make one cake, though no person would suppose that so small a quantity could make so large a cake as afterwards appears. This lump of dough is spread out flat on a table, not with a rolling-pin, but with the hands and a flat trowel or shovel. A considerable

quantity of flour is sprinkled over the surface, and the whole mass is extended till it becomes as thin as a skin of parchment. It is then turned by means of a very large shovel, after being previously pricked all over with an instrument made on purpose, and composed of a large handful of the wing feathers of ptarmigans, partridges, or some such birds. The other side, when turned uppermost, is subsequently pricked in the same manner. The cake is then put into the oven, only one being ever baked at a time. The attendance of a person is necessary, to watch the cake, and move or lift it up occasionally, that it may not burn. Much time indeed is not required for the baking. When sufficiently done, the cake is hung over a bed-post, or some kind of rail, and the two sides hang down parallel to each other. Other cakes when baked are hung near to, or over, the first. When the whole are finished, they are laid by, one upon another, in a large heap, till wanted.

Some people make bread of the bark of fir-trees. For this purpose they choose the bark of such trees as are of a large size, with but few branches, because the branches, as well as the younger trees, are more resinous, and therefore more strongly flavoured. The bark taken from the lower part of the tree is esteemed the best. The hard external coats require to be carefully removed. Stores of this bark are often laid by for winter use. Previously to its being ground into flour, it is laid over a slow fire in order to be warmed through, and rendered more friable, for it becomes by this means much thickened and very porous. It is next ground and baked, in the same manner as the barley above mentioned. The dough made of fir bark is more compact than barley dough, and almost as much so as that made of rye; but the bread has a bitterish taste.

Missen bread is made of the Water Dragons (*Calla palustris*). The roots of this plant are taken up in spring, before the

leaves come forth, and, after being extremely well washed, are dried either in the sun or in the house. The fibrous parts are then taken away, and the remainder dried in an oven. Afterwards it is bruised in a hollow vessel or tub, made of fir wood, about three feet deep; as is also practised occasionally with the fir bark. The dried roots are chopped in this vessel, with a kind of spade, like cabbage for making sour kale (sour crout), till they become as small as peas or oatmeal, when they acquire a pleasant sweetish smell; after which they are ground. The meal is boiled slowly in water, being continually kept stirring, till it grows as thick as *flummery*. In this state it is left standing in the pot for three or four days and nights. Some persons let it remain but twenty-four hours; but the longer the better, for if used immediately it is bitter and acrid; both which qualities go off by keeping. It is mixed for use, either with the meal made of fir bark, or with some other kind of flour, not being usually to be had

in sufficient quantity by itself; for the plant is, in many places, very scarce, though here in such abundance that cart loads of it are collected at a time. This kind of flummery, being mixed with flour, as I have just mentioned, is baked into bread, which proves as tough as rye-bread, but is perfectly sweet and white. It is really, when new, extremely well-flavoured. *Cattle Misne* (*Menyanthes trifoliata*) is very seldom used for making bread, being too bitter; but the roots are given to domestic cattle, who devour them fresh. This plant grows plentifully in all the rivers of this country, as well as in the neighbouring marshes.

Nordskbröd, Norway bread, is made either entirely of rye flour, or of barley with a third part rye. The dough is prepared with cold water, and kneaded a long while, till it does not stick to the hands. Afterwards it is flattened with a rolling-pin of a round shape, but furrowed longitudinally, which is turned by the hands as fast as

possible. The edges of the dough, thus spread out, are repeatedly turned in, and the whole, laid carefully on a table, makes a very even cake, as thin as paper, though smoothed with such a rolling-pin. It is baked on an iron made on purpose, being moved about and turned during the process, and subsequently smoothed and polished with a bunch of the heads of rye straw dipped in water.

In times of great scarcity, when nothing better is to be had than seeds of Spurrey, (*Spergula arvensis*,) from the fields, these seeds, after being dried, are ground and baked, along with a small proportion of corn. The bread thus made proves blackish, but not bad.

A kind of cheese is made of sour milk in this part of Norway, for which the following is the receipt.

Take any quantity of sour milk, and boil it till a thick sediment subsides. Then strain it through a linen cloth, so as to get rid of the thin watery part, when the

remainder will be of the consistence of flummery. This last must be put into a covered vessel, and allowed to stand by eight days; after which it must be mixed with cream, and stirred about in a plate, or some other convenient vessel; when it should be moulded into an obtuse conical shape, and set by in a cool place, covered up from the air. Should it happen to break, or fall in pieces, it must be stirred up and moulded over again. Leave it till it becomes sufficiently dry, which very often requires a month or two, when a rugged and cellular crust will be formed on the surface, which must be taken off before the cheese is eaten.

As I was rambling about among the hills and gathering strawberries, I perceived a Laplander carrying a fowling-piece, who seemed in pursuit of birds. Indeed I had scarcely noticed him till I heard the report of his gun, when I turned about and observed him to be very near me, though lower down on the hill. The ball struck

against a large stone at a very small distance from the spot where I stood. God be praised that it did not hit me! The fellow ran away, and I never saw him after, but I immediately returned home.

July 15.

In this part of Norway the fields are not enclosed, wood for stakes or pales being very scarce. There is no distinction between the meadow or pasture grounds and the forests, except that the latter are rather more bushy and besprinkled with a few trees, while the former are quite bare. The meadows, and even the roads, are mown, as well as fed, and yet both abound with tall grass. A woman always attends the cattle, which are not driven home at night, nor when milked, but enclosed within a moveable paling or pen. This is continually removed from one spot to another, in order to manure the ground. Horses are permitted to range at large. Hogs are yoked. The cows are milked

thrice a day, morning, noon, and evening. Flocks of sheep and goats are allowed to follow the cows.

Some persons hereabouts use stoves made of *lapis ollaris*, (*Talcum Ollaris*,) as well as boiling-pots of the same material. The stoves are without chimneys, like a small flue with an oven. The fire is always kindled in the oven, when the intention is to make the room warm, and the people make use of burning coals when they are going to bake; but they never bake in the oven. All the smoke mounts to the cieling, and finds its way out by a hole made for the purpose in the centre; but this renders the cieling perfectly black. When the smoke does not escape readily, it is necessary to make a draught by opening the door of the house. The reason given for this contrivance is, that if there were a regular chimney, too much heat would escape that way. But surely such an excuse is very lame, for much more heat must escape by opening the door. The

hole in the roof is closed at pleasure, by means of a square cover, fixed transversely to the end of a pole, which is lifted up from within.

Clay and stone abound in this neighbourhood. The walls of the houses are never built perpendicularly, although timbered; for every beam is crooked, both withinside and without. The barns are small and low, furnished with threshing-floors.

It is impossible to traverse the Lapland alps in winter, for the following reasons. In the first place, the cold is so intense that nobody could endure it. Next, no reindeer are, at that season, on the alps, but in the forests, the only place where they can procure any food. Thirdly, no reindeer could pass the alps at a stretch, the distance being too great; and lastly, it would not be possible for a traveller to carry with him the requisite supplies of clothes and provisions. For these reasons it is generally the custom to

travel over this country either in summer or autumn.

There are numerous obstacles to the cultivation of this alpine tract. The intense cold of its winters, which exceeds that of any other country. From the snow lying so long on the ground, the parts exposed to the north are incapable of any culture. Frosts are frequent even in summer. The days are dark in winter. The weather is always moist. The soil is of a turfy kind, composed of mosses decayed by frost, impregnated with standing water. Good black vegetable mould is not to be met with. Lofty trees cannot be raised, on account of the excessive violence of the wind; hence there is a great scarcity of wood.

It is customary for those in our part of Sweden who fancy themselves indisposed, to frequent watering-places, or mineral springs, during the heat of summer. For my own part, I have, thank God! for several years enjoyed tolerable health,

except a slight languor, or other trifling indisposition. But as soon as I got upon the alps, I seemed to have acquired a new existence. I felt as if relieved from a heavy burthen; and after having spent a few days in the low country of Norway, though without having committed the least excess, I found my languor or heaviness return. When I again ascended the alps, I revived as before, to which the pure and well ventilated atmosphere did not a little contribute. It is a prevailing opinion that, at a great elevation, the air is so much thinner, as to render it necessary to breathe through wet sponges held to the nose and mouth. I can aver that the difficulty of breathing is only caused by the exertion of climbing the mountains, as a person who runs fast, or uses any other violent exercise, oppresses his lungs by accelerating the circulation of the blood.*

* This opinion of Linnæus coincides with what M. de Saussure observed in ascending Mont Blanc. We cannot say so much in favour of his subsequent theory.

Did not the barometer show the pressure of the air to be less in such elevated places, it would seem contrary to reason that it should be so, upon the following principles. We know these alps to be higher than any other hills, as no current runs across them. The streams on the western side take their course down to the western ocean, while those on the east run into the sea on that side. If we take into consideration the abundance of cascades formed by these alpine torrents, in their way to the sea, the stupendous elevation of the hills will be the more evident, not only on that side but on the opposite one also. When therefore the wind blows over this country, whether from the sea or the land, the air, having to pass such great heights, must of course be more condensed by meeting with such an obstruction. Thus moreover its force is increased, as well as the sensation of cold which it gives. The air being rendered, by whatever cause, more compact

or dense, will account for its frequently freezing in these places, during the hottest summer. Cold consists in the compression, and heat in the rarefaction of the air*, hence it seems to follow that the air is not more rare upon mountains.

But, to return to the subject of watering-places, I am persuaded that those who could undertake a journey to this alpine country, would derive full as much benefit from coming hither to drink snow water, as from frequenting mineral springs, especially such as are situated in low, foggy, marshy places. One thing at least would be in their favour, that they could not so readily find means to transgress the rules of temperance, usually prescribed, if not observed, at a watering-place, by being tempted to drink strong ale or other spirituous liquors after dinner.

The exquisite purity and good flavour of water always depend on the snow, which tends to preserve water as salt does

* Here the effects are mistaken for causes.

meat. We all know how soon water is spoiled by keeping in a warm place, and, on the contrary, how long it may be preserved in a cold one. The Laplanders treasure up the snow water as if it were the choicest wine. I have observed of late that water-drinking is becoming more common in Stockholm, as among the Portuguese; but how different is the water, as well as the climate! The Lapland water is indeed uncommonly grateful to the palate.

When lately sailing on the coast of Norway, I was amused by observing my Lapland attendant, who, as soon as he grew warm, dipped his *koxa*, or ladle, into the sea, in order to drink as usual; but he was much disappointed on finding the water salt instead of fresh. These people always carry a large ladle about them, for the purpose of drinking spring water, whenever they find themselves heated or thirsty, which they do without apprehension of any bad consequences. I often practised the same during my journey. Indeed, were it

not for the abundance of this fine water, nobody could travel in Lapland, for there are no houses of refreshment. Bacchus and Ceres are both unknown there, though Venus meets with due honours. The greater part of the springs and rivers originate in the snow water of the alps; hence the latter are twice or thrice as full when the weather is warm in that part of the country.

I one day showed a Laplander some of the drawings in my manuscript journal. He was alarmed at the sight; took off his cap, made a bow, and remained with his head inclined, and his hand clapt to his breast, mumbling some words to *himself*, and trembling as if he was going to faint away*. Many people are afraid of a Jack in a box.

A curious stratagem was related to me

* This simple Laplander certainly took Linnæus for a conjurer, and the book for something equivalent to the magical drum of his own country, to which he resorts, in time of doubt or trouble, with as much confidence as a devotee to the shrine of a saint, or any other "Jack in a box."

in Norway, as practised upon the Laplanders,. by a person commissioned to take from them their magical drums and idols. Having procured information of any Laplander who kept such things concealed, he first requested to have them brought forth. This their owner refused. After having long used entreaties, to no purpose, he laid hold of one of the Laplanders' arms, slipped up the sleeve of his jacket, and so contrived at length as to open a vein. The Laplander was near fainting, and, entreating him to spare his life, promised to bring the drum required; upon which the arm was bound up immediately. This plan has been frequently pursued with success*.

* A notable method of converting these poor people from pagan superstitions, and of exemplifying the mild and just spirit of the Christian religion! This bleeding was as effectual as that practised by the grand inquisitor upon a king of Spain, who showed symptoms of humanity at an auto da fè; even without the flogging superadded in the latter case, which the pious crusader against Lapland drums did not find necessary.

In the course of my tour, my guide having one day conducted me to his next neighbour, the latter was just about shifting his quarters, and therefore could not take charge of me. The former would not attend me any further, though I paid im well for his trouble, and entreated him not to desert me. I was obliged therefore to menace him with my hanger, upon which he took to his heels. He did not however succeed in his attempt to escape, for my servant soon caught him. His fears overcame him, and he promised, trembling, to accompany me as I wished. Observing that he very often turned his head about, I made him walk before me. As soon as we came to the residence of another Laplander, and before I had well entered the hut, he set out running, not back again the way we had come, but towards the mountains, so that the devil himself could not have caught him, and leaving both his money and his civility behind him. This is a proof that severity is not the best way

of dealing here. My interpreter told me, that if the man had seen a gun cocked and presented at him, he would not have suffered a hundredth part of the alarm that he did.

Many of the curious plants, of which I had in Lapmark found here and there a solitary individual, as a great rarity, were common enough in Norway. Hence I concluded that their seeds had been brought down by the torrents, the chief of them being aquatics, as the (*Pedicularis*) *Sceptrum-Carolinum*, *Astragalus* (*alpinus*), *Acetosa* with a notched leaf (*Rumex digynus*), the white *Pedicularis* (*sylvatica*) as well as the purple, the Asphodel (*Tofieldia palustris*, *Fl. Brit.* 397,) &c.

END OF THE FIRST VOLUME.

Printed by Richard Taylor and Co., Shoe Lane, London.

Digitized with financial assistance from the
Government of Maharashtra
on 03 December, 2015